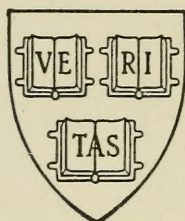


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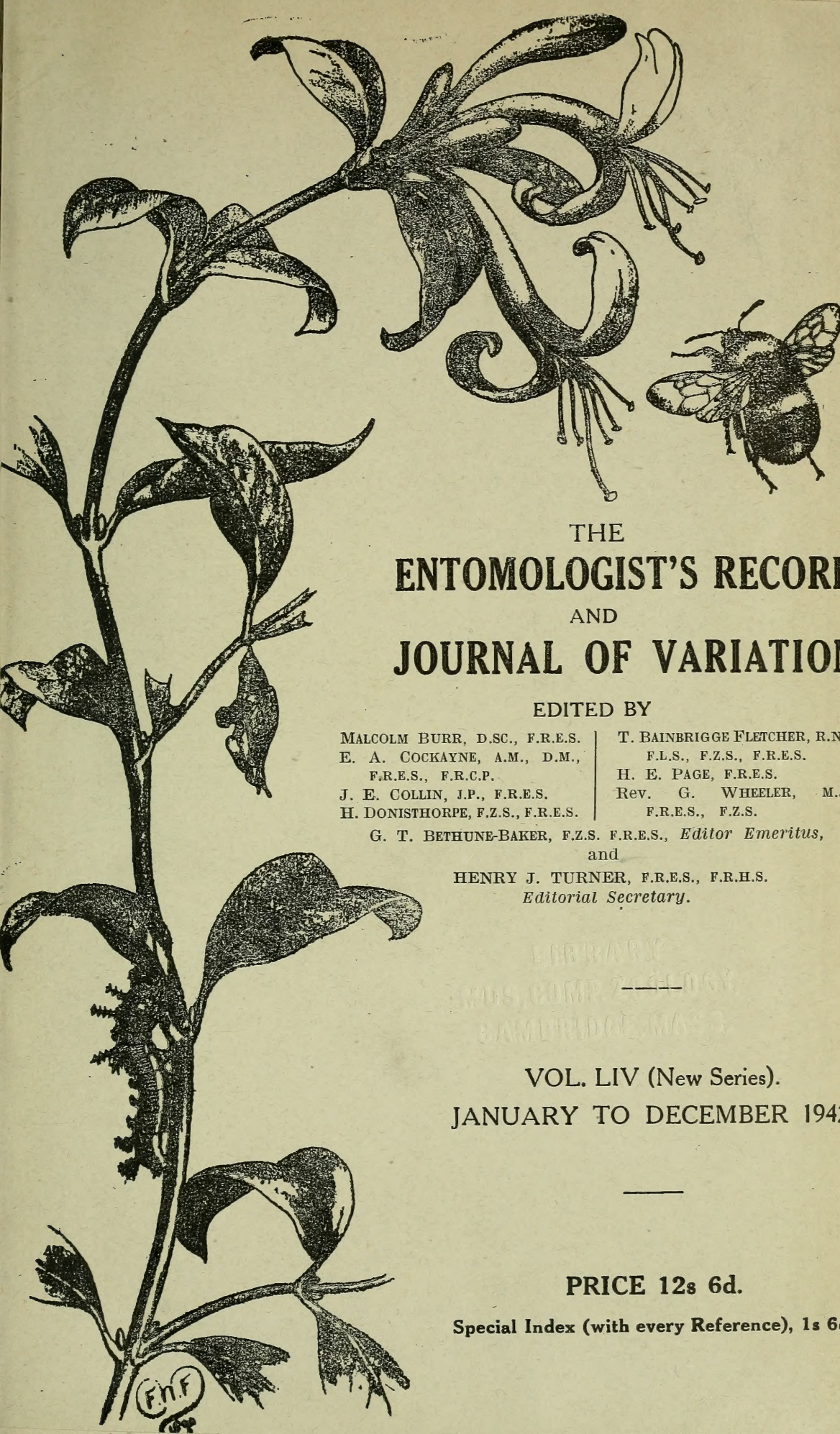


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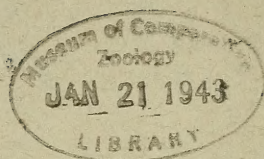
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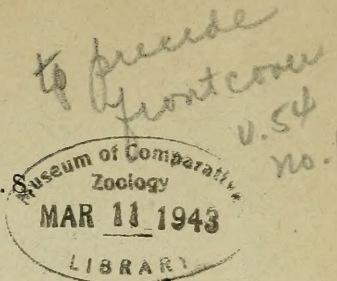


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The Entomologist's Record and Journal of Variation.

Coleoptera arranged in order of Genera. The other Orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.

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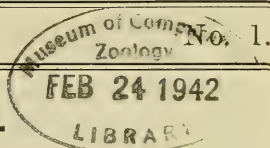
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MONTGOMERYSHIRE NOTES.

By P. B. M. ALLAN.



The glory has departed from Montgomeryshire. Famed at one time for the massive oaks with which they supplied our naval shipyards, the forests of central Wales disappeared beneath the woodman's saw during the war of 1914-18. Scattered woodlands of trees less than a century old remained until last year, when the work of disafforestation began again, and now even the oaks in the hedgerows are lying prone. Far out in the hills one hears the sound of the tractor winding up the steel cable that, with irresistible force, hauls the dismembered trunks to the top of some ravine. Wide tracts of moorland have been acquired by the Forestry Commissioners and planted with Christmas trees, nothing but Christmas trees, and presently the countryside will resemble Finland rather than Wales. The Christmas tree provides not only cheap and perishable wood for cheap and perishable houses but pulp for newspapers, and great is the power of the press. The National Trust? A voice crying in the wilderness. *Delenda est Carthago.*

I have visited Montgomeryshire for nearly thirty years, and being interested in moths (though more so in fishing) have usually spent a certain amount of time in looking for larvae and noting the imagos encountered. There are days when trout keep to the bottom of the stream and salmon sulk behind rocks: that is when an interest in Lepidoptera comes in handy.

My methods concerning moths being therefore desultory and my visits confined to the summer months, it may well be that not all the local Heterocera have come my way. For aught I know there may be several "good things" which I have missed. I have never sugared nor used a lamp. On the other hand, I have done quite a lot of searching and a little pupa-digging. Had there been anything uncommon in the districts I have "worked" I am almost sure I should have found it in one or other of its metamorphoses. For instance, I have found practically all the species which I am accustomed to find in east Hertfordshire and west Essex, and I have had no difficulty in finding such insects as are confined to the west country.

I should not call Montgomeryshire—to-day—a "rich" one so far as Lepidoptera are concerned, and anyone who decided to make it the scene of his annual holiday would most likely be disappointed. Certainly, if he came from the South, he would have no difficulty in amassing a series of *Polia chi*, provided the Shropshire border was the scene of his operations. In June he could beat an occasional larva of *Xylina socia*, Rott., from oak. In some of the larger woodlands he might take a few larvae of *Polyplocia ridens* and perhaps *Notodonta trepida*. Birches on the hillsides would yield the "Lesser Swallow" and "Iron

Prominents." But these are species which, if required, could be obtained more readily very much nearer home. The "Purple Thorn" is no more common here than it is elsewhere, and the "sallow" tribe of yellow moths are all rather scarce, though *Xanthia* (*Mellinia*) *gilvago*, Esp., may be beaten from elm as freely as it can in Hertfordshire, Cambridgeshire, and Essex. Since aspen is rare (Montgomeryshire is not a "poplar" county like East Anglia) *Cerura bifida* is rare and I have not seen—and do not expect to see—*Brephos notha*. *Notodonta ziczac*, *N. camelina* and *Pterostoma palpina* all have to make shift with sallow (*Salix cinerea*, L.) and none is as common as in the South, except perhaps the first-mentioned.

The *Cymatophoridae* are mostly present and so are *Acronicta leporina* (rare), *A. psi* (abundant), and *A. rumicis* (occasional). *A. tridens* I have not seen, nor *A. megacephala* nor *A. aceris*, though *Demas coryli* is usually to be found on hazel or birch. Of the larger moths *Dimorpha versicolora* appears to be absent, and *Lasiocampa quercus* adopts the size and colour of *f. callunae*. "Emperor" and "Fox" moths are, as one would expect in a county that is chiefly moorland, abundant. "Lappets" and "Dark Tussocks," "Cream-spot" and "Scarlet Tigers," no; though *Dasychira pudibunda* manages with birch. The "Hawkmoths" are all rare except the ubiquitous *Laethoë populi* and *Macroglossum stellatarum*, the latter usually to be seen going about his business on both high ground and low. *Dicranura vinula* is just as common here as elsewhere, and so are *Callimorpha jacobaeae*, the "Six-spot Burnet" and the "Swifts." *Leucanias* are not prone to occur on moors, but most of the *Taeniocampas* and commoner *Noctuas* occur. *Xylocampa rurea* dashes about the moorland streams in the sunshine, and the "Antler" and *Neuronia popularis* invaded our rooms nightly in their season before the black-out arrived.

Stauropus fagi and *Psilura monacha* I have not yet seen, though I expect both are here. *Orgyia gonostigma* occurs in one remote spot. For *Acronicta alni* I search in vain. Of the Geometers I have noted very few; but the "Large Emerald" appears to be commoner here than I have seen it elsewhere and it occurs as freely on alder as on birch. *Abraxas sylvata*, Scop. (*ulmata*, Fab.) occurs very locally—in fact I have noticed it (larva and imago) on only one tree!

BRUCHUS LOTI, PANZ., AB. DEFECTUS, AB. N.

AN ABERRATION OF A SPECIES OF *BRUCHUS* (COL.
BRUCHIDAE) NEW TO SCIENCE.

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.

In this aberration only the first three basal joints of the antennae are red, instead of four as in the typical form.

When sweeping *Lepidium campestre* (Field Pepperwort) in flower at Boston Manor, Middlesex, on 17th June 1941, a certain number of *Bruchus loti*, Pz., were netted. Among them was a single specimen of this new aberration; as well as several *B. loti*, ab. *holomelaenus*, Donis.

In 1939 (*Ent. Mo. Mag.*, 75, 177) I described two new aberrations of *Bruchus loti* (and introduced a named variety into the British list) taken

at Northwood, Middlesex. Of the two abs., *B. loti*, ab. *ireneae*, has not been found in any other place except the type locality; but *B. loti*, ab. *holomelaenus*, has also been taken in Windsor Forest off *Lathyrus pratensis* (Meadow Pea), 23.vii.40, and Boston Manor as recorded above.

COLLECTING NOTES.

AN UNUSUAL FOOD PLANT.—On 2nd October a friend 'phoned me that his small boy had found a large caterpillar with a horny tail, feeding on privet. Without further question I replied that it must be the larva of the "privet hawk moth," but on hearing later that it was "black with some whitish marks," I revoked my casual diagnosis, and the larva was brought to me. It proved to be one of the dark forms of *A. atropos*; but was feeding voraciously on the evergreen garden privet, which it continued to do until it pupated three weeks later. It was found on a privet bush some twenty yards from a potato patch in a garden near the sea, where the potato leaves, of course, had by then died down; so privet was preferred to privation, the larva being (to me) an unusually late specimen. The colour of the body was very dark sepia-brown, faintly sprinkled laterally towards the middle of each segment with russet-brown. There was no evidence of spots or oblique stripes. On the upper third of the first four segments was a dirty white patch; these patches were separated from each other dorsally by a dark brown line. The head was white lined with black, the tail white, spotted with rough black points. The spiracles were black and the pro-legs blue-black. Several larvae of *A. atropos* have been found this year in this area, including one in my garden, but no other than the one described above appears to have been of the dark form. I have not seen privet recorded as an occasional food of *A. atropos*.—E. BARTON WHITE, "St Merryn," Braunton, N. Devon.

RANDOM NOTES FROM EAST TYRONE, 1940—(Continued from page 55, 1941).—Reverting again to *Diaphora mendica*, race *rustica*, as the males are seldom to be taken in flight, except at light, a good way to obtain them in numbers now that out-door light is "taboo" is to enclose a number of freshly emerged females in a zinc covered breeding cage and place out of doors in the open at dusk; by next morning the wild males will be found resting all over the cage and also hiding in the surrounding herbage; as many as forty or so after a favourable night.

Plusia bractea first appeared at honeysuckle on 5th July and was afterwards common in the district, generally in damp situations, never very far from water in some form, and visited yellow Iris, Marsh Thistles, Bladder Campion, and Knapweed; *P. festucae* and *P. interrogationis* also came to the honeysuckle with a number of *P. iota*; *P. bractea* sometimes but rarely flies in the sunshine in the afternoon.

On 12th July males of the local *Nemotois minimella* were flying in little groups in the sunshine a few inches above mixed herbage growing in a damp spot.

Towards the end of the month *Selidosema plumaria* males were fairly common on one of the Lough Neagh bogs; the melanic aberrations *intermedia-fumosa* and *fumosa* are now gone owing to heather burning and

the drainage of the bog on which they used to occur.

According to Niels L. Wolff of Hellerup, the only other locality in which similar melanic aberrations have been found is on a heath on the island of Fanøe on the coast of Jutland where it is now extinct also.

At this time *Argynnis aglaia* was more or less common in suitable spots on the moorlands and hills; a few years back this was one of our rarer butterflies, though abundant on the coast of Co. Derry.

A. paphia appeared about the same date and was abundant in a number of the local woods; a male with pale spots on all the wings was taken in early August; the food plant here is wild raspberry, *Rubus idaeus*. There was a good number of *Vanessa (Pyrameis) cardui* about during August; the locally bred forms nearly always have the hindwings dark similar to one figured in South's *British Butterflies*, plate 45, fig. 4; whereas examples seen in the earlier part of the year have the hindwings of a pale fulvous colour and the marginal spots small.

Aphantopus hyperantus is always a very common butterfly here in damp woods and meadows but hardly varies at all; this year for the first time an aberration of the female was taken with forewings normal, hindwings buff coloured.—THOMAS GREER, Sandholes, Cookstown, 10th November 1941.

BUTTERFLIES PROTECTED ON BOTH SIDES WHEN IN FLIGHT.—In the November number of the *Entomologist's Record* for 1941, p. 123, the Rev. G. Wheeler in his interesting "Notes on Variation from the Worthing Museum Collection" states "I do not think, however, that the protective use on the two sides in the case of insects in motion has received much attention."

Mr W. J. Kaye's remarks on the flight of *Protogonius* species, which he observed in Venezuela in 1920 is a case in point.

These butterflies are members of the Müllerian group—*Ithomiine*, *Heliconine*, and *Nymphaline*. In *Protogonius* the underside is leaf-like (as in the Eastern *Kallima*, a very well known case of protective resemblance when the wings are closed), but the upperside presents warning colours.

Mr Kaye shows [*Proc. R. Ent. Soc. Lond.*, 55, xeviii (1922)] that when *Protogonius* is observed in flight, while sailing along overhead, it presents the upperside colouring. He proves that the reason why this happens is because the cryptic colouring of the underside is composed of partly transparent scaling which is also set more openly instead of very closely as on the upperside. The result is that the colouring of the upperside against the light shows through, and thus on the wing the *Ithomiine* appearance is complete when viewed from above or beneath.—HORACE DONISTHORPE, British Museum (Nat. Hist.), Entomological Department, 16.xii.41.

COLEOPTERA IN KIRKCUDBRIGHTSHIRE.—In continuation of my notes (ante p. 95) on insects observed in the neighbourhood of Kippford at Whitsuntide, 1-3.vi.41, I here record a few of the Coleoptera which were picked up. On the hillsides *Cicindela campestris*, L., seemed to be well established, flying about and settling on bare patches of ground among the heather. A scarcer species, *Cychrus rostratus*, L., was only seen once but such Carabids as *Harpalus aeneus*, F., *Amara trivialis*,

Gy., etc., were common. On the marsh fringing the tidal River Urr *Dyschirius salinus*, Sc., occurred in small numbers without, however, any associated species of *Bledius*. An hour or two's work with the water net in Gull Loch (very foul around the margins through the presence of numerous breeding gulls) yielded *Agabus chalconotus*, Pz., *Rhantus bistriatus*, Berg., *Hydroporus obscurus*, Sturm., *H. palustris*, L., *H. pubescens*, Gyll., *Helophorus aeneipennis*, Th., and *Laccobius biguttatus*, Gt., all rather sparingly. I did not collect many Staphs. but have notes of *Quedius mesomelinus*, Mm., *Stenus impressus*, Gm., and *Philorinum sordidum*, S., the last abundant by beating bushes of flowering broom. From a dried-up dead bird on the marsh *Nitidula bipunctata*, L., *Omosita colon*, L., and *O. depressa*, L., were taken freely, also *Catops tristis*, Pz. The marsh also produced two characteristic Solway beetles, viz., *Cantharis darwinianus*, Sh., common on long grass and on the wing, and *Phaedon concinnus*, S., crawling on the short herbage on the sides of mudbanks. Various other Cantharids were taken by beating trees and bushes the most interesting being *C. obscura*, L., a species I only meet with in Cumberland among the mountains. At Kippford it occurred at sea-level and was not uncommon on one particular oak tree which was in flower. Various species of *Meligethes* and *Epuraea* were abundant in the net, all common ones, but a single *Micrurula melanocephala*, Mm., was a useful capture as I have seldom met with it. Elaters were much in evidence, particularly *Melanotus rufipes*, Hb., *Athous haemorrhoidalis*, F., *A. vittatus*, F., *Corymbites cupreus*, F., and the var. *aeruginosus*, F. On the hillsides I found one or two dead *Lampyris noctiluca*, L., having evidently been trodden on. A dense growth of yellow iris had a strong colony of *Aphthona non-striata*, Gz., feeding on it and Figwort by the roadsides was invariably populated by *Cionus scrophulariae*, L.

In addition to these a good many commoner beetles were noted, but on the whole I did not find the Coleoptera so numerous as some of the other Orders I was collecting during my week's stay in this interesting district.—F. H. DAY, 26 Currock Road, Carlisle, 1st December 1941.

NOTES ON VARIATION FROM THE WORTHING MUSEUM—(Continued from Vol. LIII, p. 136).—Although neither of the nearest relations of *P. rapae*, viz., *P. manni* and *P. ergane* are English, it may be worth while to make a few observations on the distinctions between them and *P. rapae*. In the case of *P. manni* Mr Powell showed long ago (*Ent. Rec.*, xxi, p. 37, etc.) that both larva and pupa are abundantly distinct, but to my mind the perfect insects are just as easy to distinguish. The Italian specimens are the most conspicuously different, but in all cases specimens of *P. manni* are squarer (in Italian specimens much squarer) than *P. rapae*. The white of the ground colour is different, there is no tinge or, so to speak, hint of yellow in *manni* of the first brood, and on the rare occasions in which there is such a tint in ♀s of the summer brood the spots are so much bigger that it would be impossible to mistake them for *rapae*. The usual distinction that the spots of the forewing are concave towards the outer border in *manni* is not altogether reliable; for though this very seldom occurs in *rapae* (I have only seen one single case), it is not universal in *manni*, but all the spotting is larger (generally much larger) in *manni*. In a series side by side it

would strike one that they were almost impossible to confuse. The average of *manni* is a good deal smaller also than *rapae*.

With regard to *P. ergane*, when once recognized, it is impossible to confuse it with *P. rapae*. Although in the first brood there is a good deal of dark dusting on the underside of the hindwing, as in *P. brassicae*, *P. rapae* and *P. manni*, the whole underside is otherwise quite devoid of any markings; the ground colour of the upperside of the ♀ is canary yellow, the spotting of the upperside is grey, not black, and the specimens are much smaller than *rapae*. A pair of the latter taken at Subiaco at the same time are amongst the largest even of the Italian ones. In the field its flight is quite different from that of *rapae*, but that of *L. sinapis* may easily be taken for it. (See my notes on the subject in *Ent. Rec.*, xxii, p. 284.)

P. napi.—This is by far the most variable of the European Pierids; of the ♀s it is difficult to find any two exactly alike. One can only refer to the most remarkable races and specimens. Although the second generation in England (*sabellicae*), is much more lightly marked on the underside than the first, I have not come across a specimen that could be regarded as *napaeae*, the nearest approach being a specimen from the New Forest, and two others with rather more marked veining from Guildford and the Cotswolds. It occurs commonly in Switzerland and S. France, and in a most pronounced form in Italy. Curiously enough the Belgian specimens are of a markedly *napaeae* form. The ground colour of the hindwings underside varies from white to brilliant yellow. The former seems confined to some northern and alpine specimens; those both from the Laquinthal and from Finland which show any colour do not get beyond a very pale lemon; but specimens from the same locality taken at the same time often vary greatly: *e.g.* there are two taken on the S. Downs on 7th May 1928, one of which is only tinted with lemon, while the other shows a bright canary yellow. The specimens from S. Finland begin to merge towards the *bryoniae* form, but less so than the Irish and these again, rather less than the Scotch, of both of which there is a good series. (There is one ♀ from Tavistock that I should have thought came from Ireland if I had not caught it myself.) In Switzerland the *bryoniae* form descends as low as 3000 feet, *e.g.* at Caux and in the Val Tinière, but above 4000 it is in my experience universal. There are many specimens of this form here from Switzerland and a few from France, the ground colour of which varies greatly, one from Caux being a bright yellow while another is quite dull. The Lapland specimens are small and there is a curious albino ♀ which I took some years ago at Rognan, in which all the veinings are pale brown.

P. daphnidice.—There are no English specimens. The spring form *bellidice* is really only aberrational; most specimens of the spring brood are only distinguishable by the slightly darker green of their underside markings. The form may occur anywhere among the spring specimens; there are examples here from France, Switzerland, Italy and Greece. In the normal form the shade of green differs greatly, and though one may say that on the whole the summer specimens from Italy and Cyprus are lighter than most others, yet the shade of green differs in specimens taken at the same time and place; *e.g.* of two taken at Barcelonnette on 24th July 1934, one is much darker than the other,

and again of two taken at Jericho by Dr Buxton only three days apart in March, one would be *bellidice*, if it were not for its size, while the other has light yellowish green markings with much wider white spaces. Of course the Algerian form *albidice* stands apart with only faint suggestions of yellow markings on the underside hindwing. There are two tiny specimens from Palestine, one ♀ taken 21st May 1921 and one ♂ 2nd June 1923, much smaller than average *bellidice*, the latter of the two having a very lightly marked underside. The largest specimens are from the Lido, Corsica and Salonica.

E. cardamines.—There are series from England, Ireland, France, Switzerland and Italy, and shorter ones from Cyprus and Palestine, also one or two specimens from Belgium, Finland and the Tyrol. Of course the Cyprus and Palestine examples are of the *turritis* form, but unless there is something distinctive in the early stages, I cannot believe in any specific difference; the fact that the orange does not come beyond the discoidal spot is merely due to the absence of suffusion on the basal edge of the orange tip, which is sharply defined. This species differs in size more than any other with which I am acquainted, especially as the difference is in no sense local or geographical. It is well known that tiny specimens occur in England; there is a minute ♀ here taken at Horsley (Surrey), but there are almost equally small ones from Cyprus and Palestine. Large and small specimens come from the same localities. There are very large ♂s here from the Rhone Valley and Salonica. Southern specimens show much wider white spaces on the underside hindwing than northern ones, very noticeably in those from S. France, Italy, Greece and Palestine. The Irish ♀s have buff-coloured hindwings on the upper side. This I have only found otherwise very slightly in one ♀ from Balcombe (Sussex) and one from Aix-les-Bains, and more markedly in one from Glion, Switzerland. The one ♂ from Finland is almost devoid of the dark markings at the tip of the forewings and such as there are are very pale grey. The same is the case with a very fresh ♂ taken at Digne in July, which is probably an isolated second brood specimen, which ought to have remained in pupa till the next year. The ab. *citronæa*, with lemon suffusion inwards from the orange on the underside, is by no means uncommon, there are specimens from England as well as Central Europe. (*To be continued*).—
Rev. G. WHEELER, M.A., F.R.E.S.

PUPATION OF MIMAS TILIAE.—Last winter I dug some pupae of the Taeniocampas and small Geometers under elm, and have done the same this year. The elms were five fine trees isolated in a Corporation field. I never saw a trace of *tiliae* until this season. I noticed a thick strand of dead ivy; on giving it a rip a multitude of snails appeared. Two clung to a pupa of *tiliae*, which was cold and healthy. All the other four trees supported dead ivy, which had been cut by a gardener, and not removed. I found four more pupae, one about seven feet up in an old bird's nest. The other three were dead, two empty cases having the appearance of being split by eclosion rather than attacked by vermin; the last was wet and slightly mouldy. They were all found from three to seven feet from the ground. Possibly there were more higher up, but that I could not ascertain. South mentions the pupae being sometimes found in the chinks of bark. In this district it seems that

tiliae prefers that position, as the soil was friable and devoid of mole burrows to intimidate the larvae.—(Capt.) C. Q. PARSONS, Torquay, 28th December 1941.

VANESSA (PYRAMEIS) ATALANTA EMERGING IN DECEMBER.—On 7th December this year I noticed a specimen of *P. atalanta* drying its wings on the base of a Hawthorn in a stunted hedge surrounding a neglected garden at Pulborough, Sussex. There was a rather rough cold wind blowing at the time and this caused the insect's flaccid wings to droop and to show the red bands which caught my eye. I removed it to my hat, and continued my walk, from time to time taking off my hat to see how things were going. It developed perfectly, and was about normal size, but perhaps rather more orange tinted on the bands than is quite normal. I have always supposed that the occasionally recorded wintering of the imago of this species with us was to be accounted for by very late emergences, a very different thing to a wintering imago. I suppose there might be others in this brood emerging after this date, but I have not had a chance to search. In any case this 7th December specimen might live naturally for three or four weeks, which would carry it to January, without any attempt at true wintering as an imago.—A. J. WIGHTMAN, Pulborough

CURRENT NOTES.

IN the early part of this year a paper considered by the Council of the South London Entomological and Natural History Society as of outstanding merit, "The Nature of Hibernation in Lepidoptera," was read before the Society, and it was decided to publish it at once, with the Proceedings of 1940 then passing through the press, rather than defer its appearance for at least twelve months. It appears as Part I of the 1941 Proceedings. The author is Mr F. V. L. Jarvis, B.Sc., who desires correspondence on his work. The part (with 4 plates) can be obtained from the Society, price 2/-, from the Librarian of the Society, Chapter House, St Thomas Street, London Bridge, S.E.

THE Society for British Entomology continues that part of its activity which publishes the work of its members, although its meetings are suspended for the time being. Under date 30th June 1941, parts 5 and 6 of vol. 7 were distributed. The former, a part of nearly 80 pp. with 31 diagrams or groups of diagrams, consists of one long paper by Bryan P. Beirne, D.Sc., F.R.E.S., of Dublin, entitled "A Consideration of the Cephalic Structures and Spiracles of the Final Instar Larvae of the *Ichneumonidae* (Hym.)." Part 6, completing the volume, contains an article by R. S. McDonogh, B.Sc., D.I.C., entitled "The Morphology of *Luffia ferchaultella*, Steph., and a comparison with *Luffia lapidella*, Gceze (Lep. Psychidae)." It consists of some 20 pp. and 10 plates. As usual, these papers are extremely well printed and the general get up is admirable. Why on earth do writers and editors fence in the names of the authors of specific names? These brackets have no real meaning, only a negative indication regarding the genus name.

It is both cumbrous, completely unnecessary, and thus is stupid. More useful and far better would it be to give the author of the genus as did the founder of this journal, the late J. W. Tutt.

WE should like to call the attention of all who may be interested in Variation in our British Butterflies to the wonderful "Monograph of British Aberrations of the Chalk-hill Blue Butterfly," by Messrs P. M. Bright and H. A. Leeds, as it may be the last chance of buying it at a reduced price with an "Addenda" including the "Small Copper Butterfly." "The book was issued in 1938, and the first lot, bound in leather covers and priced at three guineas, is exhausted. Printing and sufficient plates for 400 books have been obtained, and an 'Addenda' has now been included for the Aberrations of the Small Copper Butterfly, *Lycaena phlaeas*, by H. A. Leeds, thus making it the most important work on aberrations which has ever been issued in one volume. Its 18 plates contain over 400 illustrations of *L. coridon*, 96 of which are reproduced in colour from the best photographic method obtainable. These are now at the publishers, The Richmond Hill Printing Works, Limited, Yelverton Road, Bournemouth, Hampshire. They are being bound in strong covers. To give libraries and collectors an opportunity of obtaining this comprehensive work, and as an inducement to distribution, the price is temporarily reduced to two guineas, post free, from the publishers. Everyone who already has a copy of the above book should have by now received the 'Addenda' mentioned free."

THE *Revista Soc. Ent. Argentina*, Vol. xi, No. 1, contains another contribution to his favourite Group *Hesperiidae* by Capt. Kenneth J. Hayward, "The Food Plants of the *Hesperiidae* found in the Argentine." There is also a very full obituary notice of the late Dr Walther Horn (1871-1939) with portrait.

WE are pleased to see that the Journal of the B.E.N.A. (British Empire Naturalists' Association), *Country-side*, is to be continued. The minimum subscription is 4/- per annum. There will be four numbers per year; No. 1 has already been issued (December). The Hon. Secretary is Leslie Beckett, 22 South Drive, Ruislip, Middlesex. The present number contains a considerable amount of notes on Natural History, including some on Entomology and Botany.

THE *Proceedings of the Royal Irish Academy*, published in October, contains a "List of the Microlepidoptera of Ireland," by Bryan P. Beirne, Ph.D., F.R.E.S., F.L.S. There is a short historical Introduction. Seven hundred and nine species have been recorded, but of these 105 are more or less doubtful. Each species is annotated with the areas of recorded occurrence, dates and odd notes, and the book forms a mass of references indispensable to the ardent student. It consists of nearly a hundred pages of small folio size, and can be purchased at 4/-.

THE *Jrn. Soc. Brit. Ent.*, Vol. 2, Pt. 3 (36 pp.), contains 16 notes of varied length, several short ones of which might have been better sent to one of our monthly well-circulated magazines. The longer notes deal with hitherto little known insects; "New Species of Plecoptera;" "Revised List of British Psocoptera," both by D. E. Kimmins; "Hemip-

tera and Homoptera associated with Cultivated Fruits," by A. M. Masee; "Notes on *Ischnura pumilio* (Dragonfly)," by Lt.-Col. F. C. Fraser (with plate); and the Obituary notice of the late Dr F. W. Edwards, F.R.S., the famous Dipterist of the B.M. Staff.

THE *Entomological News* of Philadelphia still keeps up its Natural History aspect of Entomology and has not yet succumbed to the professional element which deposes the view that insects are "things of beauty" in both their varied appearance and in their wonderful natural life-history, and substitutes a series of scratches in illustration, which the lovers of nature cannot admire and much less understand to be interested in. The content of the November number is most interesting matter. (1) An instance of Prothetely or the presence of pupal characteristics in the larval stage; in this case in a Coleopteron, *Scolytus multistriatus*, with a diagram to illustrate. (2) Butterfly Notes on the Rhopalocera of Columbia (the notes are short, but comprehensive); Spring and Autumn forms of *Pieris protodice*; A Spring form of *Papilio ajax*; Occurrence of the marsh *P. palamedes* so far North; An intermediate form between late spring and summer forms, etc. (3) A new local race of a Vespidae from Mexico, description and comparison. (4) Description and comparisons of seven new species of Millipeds from Mexico, illustrated with 2 plates of external structure. (5) A very interesting note on the subject "Cockroaches, the forerunners of Termites." The former often deposit egg cases with the ova already hatched, while the latter drop their ova singly; but some species of the Blattidae also deposit their ova singly.

THE *Canadian Entomologist* for October last gave a curious result of the grasshopper outbreak in Manitoba in 1874-75, when severe and almost irreparable damage was done to the crops. Advances were made by the Administration to all the settlers who would otherwise have been utterly ruined. Food stuffs and seed grain were imported from the United States. Mortgages were taken with the homesteads as security at 6 per cent. These were gradually paid off but strange to say, even now, nearly 70 years after, there is still outstanding, in spite of much being written off, \$26,000 not redeemed.

CORRECTION.—"On pp. 4-5 of my MS. of "The Phenological Classification of Palaearctic Lepidoptera," which was written before Mr Talhouk's second article on *Eriogaster philippii*, Bartel, reached me, I stated that his breeding of that species seemed to show that its pupae did not irregularly wait several winters before emergence. It was hasty of me to argue from his silence on this subject in his first article, as the observations in his second article now show. In the circumstances you may already have written to me asking if I do not wish to alter the MS. in view of Mr Talhouk's later record. If the MS. has not yet been published would you therefore kindly delete from 'since Talhouk's breeding . . .' to the end of the paragraph, i.e., ' . . . cool temperate climate.' If it is too late to make this excision, would you please publish this letter of explanation. My suggested explanation of the phenomenon referred to (retarded pupal development) must now probably be abandoned."—E. P. WILTSHIRE, Iran.

REVIEW.

THE LATHRIDIIDAE OF ECONOMIC IMPORTANCE (By J. E. Hinton), *Bull. Entomological Research*, **32**, 191-247 (1941).

This paper deals with 30 species of *Lathridiidae*, which have been recorded on stored food products, or have been found in warehouses, granaries, and mills. These species are adequately and often very fully described and should be easily and accurately identified. A further 11 species are included in the key to the adults, which have been found in houses and cellars, and might occur on stored foods. The key to the adults occupies some 5 pages and appears to us to be both sound and workmanlike. There are also keys given for all the known larvae and pupae.

Very useful summaries of the distribution, habits, life-history and literature accompany each species. The complete life-history of five of the species has been worked out for the first time by the author, and partly so of a sixth. Only 10 of the species referred to in this paper have not as yet been found in Britain. It will thus be seen that the work should be in the hands of all students of British Coleoptera.

All the figures appear to us to be very well executed, the outline ones having been drawn by the author himself. A very full and useful list of references is given at the end of the paper.

The following points concerning some of the many interesting insects mentioned in the text have occurred to us:—Three species of *Holoparamesus* are recognized, viz.—*H. caularum*, Aubé, *H. depressus*, Curtis, and *H. singularis*, Beck. Fowler [*Col. Brit. Isles*, **3**, 276 (1889)] only gives the first two species, considering that *singularis*, Beck., is a synonym of *depressus*, Curtis. On the other hand, Beare [*Cat. Brit. Col.*, p. 27 (1930)] only mentions *caularum* and *singularis*. The author shows that *singularis*, Beck., and *depressus*, Curtis, are distinct species, and that *H. kunzei*, Aubé, is a synonym of the latter. Consequently, three British species must now be recognized, of which *H. singularis* is much the rarest.

Coninomus constrictus, Gyll., and *C. carinatus*, Gyll., are treated as being synonymous. Personally I am inclined to consider them to be good species. I have taken what I consider to be the two species in Windsor Forest, which appear to me to possess the characters which separate them. Both the late Commander Walker and I have found the former in the nests of *Acanthomyops* (*Dendrolasius*) *fuliginosus*, Latr.

Lathridius bergrothi, Reitter, was taken in some numbers by the late W. Holland by beating firewood faggots in his cellar at Oxford.

Adistemia watsoni, Wollaston.—This very distinct little species was recorded by Champion in 1912 (as pointed out by our author) as having been found in the Geological Department of the British Museum (Nat. Hist.). Since that date until the publication of the present work under review, it has only been noted in *An Exchange List of British Coleoptera* by Newbery & Sharp, Plymouth (1915), sub *Cartodere watsoni*, Woll., and in Beare's *Cat. Col. Brit. Isles*, London (1930), under its correct name. Hinton in 1941 collected some 75 adults and a few mature larvae in the British Museum (Nat. Hist.) on plants attacked by fungi. A certain number of specimens also occurred in a sink in a study in

the Museum. From this material he worked out the complete life history of the beetle. He tells me that he has since taken a specimen in a flat in South Kensington about a quarter of a mile from the Museum. This is the first British record of this insect having been taken outside the Museum, and it may have, or will probably, spread to many parts of Kensington at least.

Cartodere filiformis, Gyll.—This beetle was also found rather frequently in the sink above mentioned at the Museum. The insects no doubt sought this situation for the sake of moisture. Mr Hinton tells me he took a specimen on the wall of a lavatory in a house at Linton, Cambs (8.vi.41), and Mr S. O. Taylor took it very sparingly in company with *C. flum.* Aubé, in the herbarium of the Museum in Leicester. These are, of course, new county records.—HORACE DONISTHORPE, Entomological Department, British Museum (Nat. Hist.), 3.xii.41.

“PROCEEDINGS AND TRANSACTIONS OF THE ROYAL ENTOMOLOGICAL SOCIETY” FOR THE YEAR 1941-(2).—This Society has again put forth an astonishing amount of matter and again notable for its comprehensiveness. When the Official Report of the Council, the President's Address, the Treasurer's Report and Balance Sheet are completed, the issue will contain nearly 1200 pp., with 44 plates (19 coloured), about 800 figures including maps. It will be remembered that in last year's Transactions the outstanding paper was by Dr Roger Verity on the *athalia* Group of Melitaeid butterflies with a very large number of figures. The volume for the present year also has an outstanding paper. Dr L. G. Higgins has contributed a wonderful paper on the *didyma* group of the same genus, illustrated by 16 coloured plates containing nearly 200 beautiful figures and about the same number of structural figures in the text in addition. In fact the article appears to contain almost all the details of this very difficult group of species, whose forms range over almost the whole of the Palaearctic Region. Quite half of the remaining papers in the Transactions give no illustration of the insects they deal with, and much of the matter is the result of an intensive study that but few of the average fellows of the Society can appreciate, and make use of. Another paper, by a N. American author, deals with the variation in a *Colias* of the subgenus *Zerene*. It is illustrated by three coloured plates. One other paper is on Rhopalocera. Four on Hymenoptera, one each on Orthoptera, Coleoptera, Hemiptera, Odonata, Plecoptera and Thysanoptera, complete the issue. The *Proceedings* contain a considerable amount of matter, reporting the smaller items which are discussed at the ordinary monthly meetings of the Fellows.

Please remember that the Journal is always in need of short COLLECTING NOTES and CURRENT NOTES of interest to our general readers and observers.

insect almost unicolorous; in *lutea* the dark inner and outer bands are much broken up and the yellow ground colour appears all over the wing. Both forms are scarce, and the latter is very rare.

Culot's three figures are beautiful, plt. lv, fig. 3, 4 and 5, but incorrectly named. Fig. 3 is a good one of the typical form; fig. 4, called *fucata*, is no more than *virgata*, Tutt; while fig. 5 is *rutilago*, Fab.

The Forms and Names to be considered:—

aurago, Schiff., *Verz.*, 86, S. 7 (1775-6).

aurago, Fab. (1787), *Mant.*, II, 159.

f. *rutilago*, Fab. (1787), *l.c.*, II, 160.

praetexta, Esp. (1788-?), *Abbild.*, IV, 338, plt. 124, 2.

ab. *fucata*, Esp. (1788-?), *l.c.*, IV, 341, plt. 124, 3-4.

ab. *virgata*, Tutt (1892), *Brit. Noct.*, III, 13.

ab. *unicolor*, Tutt (1892), *l.c.*

ab. *lutea*, Tutt (1892), *l.c.*

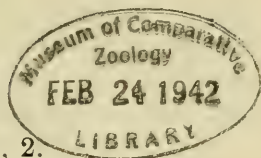
ab. *marmorata*, Warr.-Stz. (1911), III, 154, plt. 24h.

ab. *pedinea*, Dnhl. (1929), *Mitt. Münch.*, XIX, 115.

ab. *purpurago*, Dnhl. (1929), *l.c.*

ab. *pyrrhexesta*, Dnhl. (1933), *Ent. Zeits.*, XLVI, 260 [rect. *pyrrhoxesta*.]

ab. *intermixta*, Whtmn., n. ab.



Tutt dealt with (1) type, pale yellow with dark basal and outer bands; (2) ab. *virgata*, pale orange with dark basal and outer bands; (3) ab. *unicolor*, pale orange almost unicolorous; (4) f. *rutilago*, deep orange-red with basal and outer bands; (5) ab. *fucata*, deep purplish-red, almost unicolorous; (6) *lutea*, yellow orange.

Esper, *l.c.*, IV, 339, gave Schiff., *Verz.* (1775-6), *rutilago*, and Rott., *Naturf.* (1776), as synonyms of his *praetexta*. This was not probable as the former was a poplar feeder and the latter fed on *Ononis*. Esp. also quoted the description of *rutilago* by Fab. (1787), thus the plate was possibly issued in late 1787 but the description of *praetexta* could not have been published until late (1789) or in (1790).

ab. *marmorata*, Warr.-Stz., *Pal. Noct.*, III, 154 (1911).

FIG.—*l.c.*, plt. 24h.

ORIG. DESCRIP.—“The yellow central area thickly mottled with orange.”

ab. *pedinea*, Dnhl., *Mitt. Münch.*, XIX, 115 (1929).

ORIG. DESCRIP.—“An extreme unicolorous variety, white-yellow and wholly without markings. But there can be a relic of the marking in an extremely fine reddish or bluish-reddish infusion.” Central Italy.

ab. *purpurago*, Dnhl., *Mitt. Münch.*, XIX, 115 (1929).

ORIG. DESCRIP.—“Deep orange to deep golden-yellow ground colour, with rich dark red infusion. The markings are dark blue-grey and vary extraordinarily as seen in the appearance of the many known forms. In specimens with clearly impressed markings the definition can be quite absent, giving the appearance of a uniform dull purple tone.” Montana Grande.

ab. *pyrrhoæsta* [sic! rect. *pyrrhoæsta*], Dnhl., *Ent. Zeits.*, XLVI, 260 (1933).

ORIG. DESCIP.—“Are common unicolorous examples of the *purpurago*, Dnhl., form. The ground colour is a brighter orange with a violet sheen.” Scanno, Tyrol.

ab. *intermixta*, Whtmn., n. ab.

ORIG. DESCIP.—The basal and outer bands are rich red broken up by yellow and the central fascia has the yellow so heavily marked in the band colour, red lines and spots, as to produce an even-coloured insect of mottled red and yellow.

Mellinia, Hb. (1821), Tutt [*Xanthia*, Ochs. & Tr. (1816-25), Dup., Gn.: *Orthosia*, Ochs. & Tr. (1816-25), H.-S., Meyr., Barr., Stdgr., Splr., Culot, Meyr.: *Amathes*, Hb. (1821), Hamps., Sth., Warr.-Stz.: *Crasia*, Auriv. (1891)] *circellaris*, Hufn. (1766).

The name *ferruginea*, Esp., was used by many writers for this species as Hufn.'s name was introduced before the then recognized priority date, viz. S.N., XIIed., 1767.

The name *ferruginea* was given by Schiff., *Verz.*, 86, R. 7 (1775), to a Noctua “Ochre-brown and reddish marked,” which Illiger, *Neu Ausg. Verz.*, said was the *undosa*, Bork. (I, 300). Werneb., *Beitr.*, I, 423 (1864), determined this *ferruginea* was the *circellaris*, Hufn. This had already been stated by Bork. (*teste* Tr., *Schm.*, V (2), 349 (1825)). The description in the *Verz.* was too indefinite to be considered as the prior.

The *ferruginea*, Esp., figures *Abbild. Bomb.*, III, 246, plt. 47, f. 5-6 (1782-?), are so bad that Bork., although he cited them, said that they were not good enough to be recognizable. Werneb., *Beitr.*, II, 29 (1864), said that they were rough and more or less useless and he even went so far as to suggest that f. 5 was probably *tenebrosa*, and f. 6 might be this species or not.

Tutt, *Brit. Noct.*, III, 15 (1892): Meyr., *Handb.*, 62 (1895): Barr., *Lep. Brit. Is.*, V, 338, plt. 226, f. 3 (1899): Stdgr., *Cat.*, IIIed., 206 (1901): Hamps., *Lep. Phal.*, VI, 480 (1906): Splr., *Schm. Eur.*, I, 249, plt. 44, f. 10 (1907): South, *M.B.I.*, II, 14, plt. 7, 9-10 (1908): Warr.-Stz., *Pal. Noct.*, III, 151, plt. 37 e, f (1910): Culot, *N. et G.*, I (2), 79, plt. 53, f. 13-14 (1914): Meyr., *Rev. Hand.*, 122 (1928): Drdt., *Pal. Noct. Supp.*, III, 154, plt. 19d (1934).

Ernst & Engram., *Pap. d'Eur.*, VII, 11, f. 408 (1790), gave three figures much too highly coloured.

The *ferruginea*, Esp., *Abbild. Bomb.*, III, 246, plt. 47, f. 6 (1782), were not considered as a *circellaris* by Werneb., *Beitr.*, II, 29 (1864). Their colour and markings are rough and more or less indeterminate. Fig. 5 he said may probably depict *tenebrosa*, while fig. 6 is quite unrecognizable as *ferruginea* or any other species.

The *fuscago*, Esp., *l.c.*, 382, plt. 75, f. 5, Werneb., *l.c.*, 33, determined to be *circellaris*, Hufn., the pale ochre form, and the *ferruginea*, Schiff.

The *rubecula*, Esp., l.c., IV, 526, plt. 157, f. 4 (1788-?), Werneb., l.c., 47, determined to be *circellaris*, Hufn., "a small bright coloured example from Italy." In fact the red form now known as *ferruginea*, Hb.

The *undata*, View., *Tab. Verz.*, II, 17, plt. 1, f. 2 (1789), was determined by Werneb., l.c., 213 (1864) as the ochreous form *circellaris*, Hufn. The figure is a strong red form.

The *undosa*, Bork., *Naturg.*, IV, 753 (1792), is stated by the author to be the *undata*, View.

Illiger, *Verz.*, I, 300, R. 7, *ferruginea* (1801), "The ochre-brown, reddish marked Noctua," said it was the *undosa*, Bork.

Hb., *Samml. Noct.*, 181 (1800-3), under the name *ferruginea* gave an excellent figure, l.c., 688 (1818-22), under the name *macilenta* gave a very dark form of this species.

Tr., *Schm.*, V (2), 349 (1825), in a footnote, said that Bork. himself stated that his *undosa* was *circellaris*, and that the citation to the *Verz.* (Schiff.) and to Esp. were correct in spite of the figure of the latter being not good enough to be relied on.

Tr., l.c., used the name *ferruginea*, Verz., although he cited the *circellaris*, Hufn. [The correct date of Hufn. was before the date of the *Sys. Nat.*, XIIed. then recognized for priority.]

Dup., *Hist. Nat.*, VII (1), 470, plt. 130, 2 (1827), gave a very good figure under the name *ferruginea*. In his *Cat.* he included ab. *macilenta*, Hb., 688.

H.-S., *Sys. Bearb. Noct.*, II, 203 (1849), said that Hb. 181, *ferruginea*, was a smaller ♂ "too dark towards the margin," and of Hb. 688, *macilenta*, "shape bad," "hindwing too small."

Gn., *Hist. Nat. Noct.*, V, 397 (1852), dealt with this species under the name *ferruginea*, Schiff. He included the *fuscago*, Esp.; *macilenta*, Hb., 688, 689, nec 418; *circellaris*, Rottem. (*Naturf.*); *undosa*, Bork.; and *undata*, View. He then described var. A. *ferrugineoides*, Gn., from America. Now considered a species.

Splr., *Schm. Eur.*, I, 249, plt. 46, 10 (1907), gave a poor figure. He recognized ab. *ferruginea*, Hb., ab. *fuscconervosa*, Ptrsn., and ab. *nigridens*, Fuchs.

South, *M.B.I.*, II, 14, plt. 7, 9-10 (1908), gave two good figures of the usual form of ochreous colour.

Warr.-Stz., *Pal. Noct.*, III, 151, plt. 37e, f (1910), treated *fuscago*, Esp., as a synonym. They considered *macilenta*, Hb., fig. 688, as one of the forms of this species. They gave four good figures: *circellaris*, Hufn. = *fuscago*, Esp., as a synonym; *ferruginea*, Esp., 37e (*undata*, View., and *undosa*, Bork.), as synonyms; *macilenta*, Hb. (688 and 37f); ab. *fuscconervosa*, Ptrsn., 37f; ab. *nigridens*, Fuchs.

Culot, *N. et G.*, I (2), 79, plt. 53, f. 13-14 (1914), gave two excellent figures. 13, a typical form; 14, ab. *ferruginea*, Gn., with wings of a much deeper colour.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 152 (1934), gave two new forms.

Of the Variation Barrett wrote:—

Variable in the ground colour of the forewings from pale yellow to pale fulvous, brownish-buff, or even greyish-buff; and in the intensity

of the markings, which commonly are rather faint, often very so, but on the other hand, in some individuals extremely distinct, the two transverse slender stripes especially so, or in addition all the lines and the nervures strongly coloured. This last especially from S. Wales.

He reports specimens from S. Yorkshire in which the lines and nervures "are so intensified that the central shade is broadly dark purple, and the lines of the same colour."

Another "is of a rich ochreous colour with hardly a trace of markings."

The Names and Forms to be considered are:—

circellaris, Hufn. (1766), *Berlin. Mag.*, III, 404.

f. ferruginea, Esp. (1782-?), *Abbild. Bomb.*, III, 246, plt. 47, 6.

fuscago, Esp. (1782-?), *l.c.*, 352, plt. 75, f. 5 (=typical).

undata, View. (1789), *Tab. Verz.*, II, 17, plt. 1, f. 2 (=ferruginea).

rubecula, Esp. (1789-?), *Abbild. Noct.*, IV, 526, plt. 157, f. 4 (=ferruginea).

undosa, Bork. (1792), *Naturg.*, IV, 783 (=ferruginea) teste Bork.

f. ferruginea, Hb. (1800-3), *Samml. Noct.*, 181 (=ferruginea, Esp.)

f. macilenta, Hb. (1818-22), *l.c.*, 688.

f. ferruginoides, Gn. (1852), *Hist. Nat.*, V, 397. (American species.)

ab. nigridentis, Fuchs (1883), *Stett. e. Ztg.*, 263 (= ? *f. macilenta*). See Tutt, *l.c.*, IV, 122.

ab. fusconervosa, Petersen (1902), *Beitr. Lep. Fn. Est.*, 200.

ab. clara, Schultz (1906), *Soc. Ent.*, XXI, 3.

ab. catenata, Dnahl. (1926), *Ent. Zeits.*, XXXIX, 188.

Tutt gave the author of *ferruginea* as Hb. although he gave Esper's description. Most of the early authors referred back to the *Verz.* (Schiff.) who was the first to use this name for a Noctuid, "the ochre-brown, reddish marked Noctua," p. 86, R. 7, which Illiger, *Ausg. Verz.* (1800), I, 300, said was the Noctuid Bork. had described as *undosa*.

Tutt dealt with (1) the typical pale ochreous *circellaris*, Hufn.; (2) the bright red *ferruginea*, Hb.; (3) the *ab. fuscago*, Esp. = the ochreous *circellaris*; (4) the *undata*, View. = the red *ferruginea*; (5) the *rubecula*, Esp., "appears to be the same red form"; (6) the dark suffused form, *macilenta*, Hb., 688; (7) *nigridentis*, Fuchs. "This form is apparently the var. *macilenta*, Hb., or sufficiently near to be classed with it," was Tutt's opinion. Also the *ferruginea*, Esp., was the same.

ab. fusconervosa, Ptrsn., *Beitr. Lep. Fn. v. Est.*, p. 200 (1902).

ORIG. DESCR.—"Al. ant. venis fuscis."

"While, in the typical form, the veins are for the most part whitish, there appears among these typical forms not rarely specimens in which the veins are blackish throughout." Estland.

var. *clara*, Schultz, *Soc. Ent.*, XXI, 3 (1906).

ORIG. DESCR.—"A further form is made mention of in the following, which on account of the distinctive characters makes such a strong impression, that one is urged, at the first glance, to consider it a separate species. Its ground colour is neither pale ochre-yellow nor light reddish, but very white with slight yellowish tinge, generally quite without this

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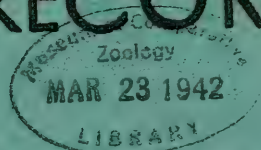
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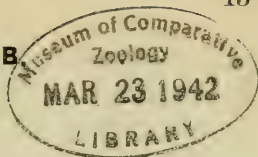
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CIRRHOEDIA XERAMPELINA, HB.

By A. J. WIGHTMAN, F.R.E.S.

13,820



This species damages itself so readily that it is only possible to get a true idea of the colour variation from long bred series; wild taken examples are misleading if at all worn or faded. I refer in these notes to the anterior wings only. The inferior wings vary very little indeed. The colours in *xerampelina* are basically the same as those in the fairly closely allied *Ochria aurago*, and the variation in the two species is very similar. The most usual form of *xerampelina* in this country is some shade of yellow in ground colour, marked in same shade of red.

There is a very ill-developed longitudinal basal line (often a mere dot), a wide central band from inner margin to the strongly marked reniform but not to the costa, and an outer marginal band which does not reach the apex.

The costal vein and inner margin are irregularly lined in red, while the cilia on the outer margin are red and concolorous with the outer band.

The veins are especially highly coloured where they pass through the bands, and appear as fine red lines in the area between the bands.

The variation from above is extreme as regards colour and there are certain modifications and intensifications in the markings apart from the suffusion of the pale ground colour areas, with band colour scales (which produce the most richly coloured aberrations).

The outer marginal band and reniform stigmata are rather constant in form, but the central band may be broken up and consist of a few high coloured veins with slight suffusion towards one another and separated by narrow wedges of pale ground colour, or, in some purple-marked examples, by wedges of pale purplish-grey.

This central band may be narrow or nearly twice the width and occupy two-fifths of the whole wing space.

All the above forms have the markings sharply defined and occur in two rather different colour groups.

One in which the ground colour is some shade of yellow dusted with red scales, giving a slight orange tone, the markings in some shade of red and the cilia red and concolorous with the outer band.

The other with the ground colour yellow with the scattered high colour scales, purple or grey rather than red, giving a saffron-yellow tone with the markings in some shade of purple-grey, the cilia red and in striking contrast to outer band.

Forms occur in which the central band is complete to costa, with markings still clearly defined, but there is always a slight darkening of ground colour areas in such insects. From these insects with clear-cut markings there occur forms in which the central band not only reaches the costa but in which the outer area of the wing is suffused with band colour scales, both outwards from the central band and inwards from the outer band, so that the yellow ground colour in the outer area is reduced to a mere yellow transverse streak, but the basal area remains comparatively pale.

The true ground colour is invaded in ever increasing volume (in different individuals) by dark band-colour scales, breaking down the

clear definition of the markings and ending in forms which may fairly be described as unicolorous.

Apparently all the more or less even colour forms have been treated as ab. *unicolor*, Stdgr., but there are widely different unicolorous and nearly unicolorous forms, and the name cannot reasonably be applied to them all, in view of the original description of the form, which is not very comprehensive. "Al. ant. fere unicolor, rufescentibus, flavobistrigatis" (*Catalog.*, iii, p. 116).

South figures (*Brit. Moths*, ii, plate 4) as *unicolor* a very pale unicolorous form with central fascia edged with dark lines, the opposite extreme to the form treated by Tutt (*Brit. Noc.*, iii, page 17) as *unicolor*, Stdgr. (described by Guenée and named by Staudinger), and Mr Warrington's Manx form as described by Birchall which Tutt included under Staudinger's name.

Seitz (*Pal. Noct.*, iii, plt. 28 f) figures as *xerampelina* a rather high ground colour form, and as *unicolor* a brownish not quite unicolorous form.

On the same plate Seitz figures a nearly unicolorous form with dark edge to central fascia, as *rufa*. But it is far too rosy for *xerampelina*, in which the colour in these high colour abs. is produced by red, yellow and purple-grey scales, and the reds are always terra-cotta or brick, never rosy-red.

The following summary, while of course not all-embracing, will include all the more usual forms occurring with us.

- A. Central band broken up.
 - a. Ground colour pale yellow, markings in purple-grey.
 - b. Ground colour pale orange, tinted yellow, markings in pale dull red.
 - c. Ground colour pale orange-yellow, markings in deep rich red.
- B. Central band solid to reniform stigmata.
 - d. Ground colour pale primrose, markings in purple-grey.
 - e. Ground colour pale orange, tinted yellow, markings in some shade of red.
 - f. Ground colour pale saffron, markings in purplish-slate.
 - g. Ground colour smoky saffron-yellow, markings in dull purple.
- C. Central band reaches costa, only slight suffusion of outer area.
 - h. Ground colour dull pale orange, markings in red-brown.
 - i. Ground colour smoky saffron, markings in purplish-black.
 - j. Ground colour dull buff, markings in dull grey.

All above have clear-cut markings.
- D. Outer area much suffused with band colour scales. Only basal area still pale.
 - k. Ground colour yellow, markings in dull brick-red.
 - l. Ground colour pale orange, markings in terra-cotta-red.
 - m. Ground colour smoky yellow, markings in brownish-orange.
- E. Unicolorous except for fine yellow lines bordering the central fascia, which is slightly deeper in tone than inner and outer areas.
 - n. Dull greyish-buff.
 - o. Deep reddish-orange.
 - p. Terra-cotta-red.
 - q. Dull purple-red.
 - r. Yellowish-slate.
- F. Unicolorous except for slate-grey marbling in the area of the bands, due to deep slate colour veins in these areas.
 - s. Deep reddish-orange.
 - t. Terra-cotta-red.

The various forms occur wherever the species is found, I believe, but certain localities produce much higher percentage of extreme forms than others.

COLLECTING NOTES.

NOTES ON VARIATION FROM THE WORTHING MUSEUM (*Continued from p. 7*).—*L. sinapis*.—The variation in this species is considerable but almost confined to the underside of the hindwing in the spring brood. In the English specimens this is more or less clouded with grey on a white ground; in one example the whole lower half is covered, giving a pronounced specimen of the *subgrisea* form, to which English specimens all tend. In the south of France all the specimens are of the *sartha* form with a bright yellow ground colour; many Swiss specimens are of the same form, though the yellow is rather lighter. One from Salonica is still lighter, and hardly amounts to being *sartha*. The Corsican specimens are all *subgrisea*; those from Savoy and the Tyrol are very faintly marked, those from Finland even more faintly. The Italian specimens from the Portofino peninsula are very elegant, with a slightly yellow tint and very neat markings. If this form is really *lathyri*, as Dr Verity seems to suggest, the much more heavily dusted form from Switzerland, which I have always thought to be *lathyri*, is not so. During the eleven continuous springs when I hunted in Switzerland this form was almost (if not quite) universal in two years, but never appeared in the other nine. On the upperside ♂s differ very little, though the tips are generally lighter in southern specimens than in more northern ones; on the other hand those from Finland show the lightest grey of all, and less of it. The amount of grey in the tips of the ♀—never much—varies considerably from whatever locality they come. The summer brood varies very little any where; the ground colour of the underside hindwing is always white and very slightly marked if at all; in fact all that are not *diniensis* (♂) and *erysimi* (♀) are very close to these forms. The black at the tip of the upperside forewing of the ♂ varies somewhat in size but is always black and not grey. The average is larger than that of the first brood. The largest specimens come from Reazzino in Ticino.

C. croceus (edusa).—Except for the dimorphic ♀s there is no major variation, but the minor variation is considerable. First in size: the early brood in S. France shows very small specimens, the only others are one first brood example from Salonica and one August ♂ from Fiesole. There are examples of three broods from Salonica, the second (May and June) being much larger than the first (March and April); the third (or should it be the fourth?) (August and September) is not quite so large as the second. Others of very large size are a series from the Lido taken at the end of May and a series from Algeria of the same month; others not quite as large are from Cyprus (April and May). August specimens from the Rhone Valley are also large, as well as June ♀s from the Tyrol and Aix-les-Bains. English specimens are of average size, inclining rather towards the small side. May specimens from Tuscany are about the same size, while other Italian specimens are large. I have not found any ♂ without yellow veinings in the black tip of the forewings though the lines are very narrow and very rarely reach to the ground colour, and in two of the French specimens they are almost obsolete. The collection shows very little difference in the shade of the orange ground colour, but one small ♂ from Salonica is a good deal paler, and those from Corte in Corsica rather paler than the rest. Variation in the ♀s is mostly confined to the spotting in the border. This is very varied in individuals of the same brood and the

same locality. There is no specimen without any, but there is one from S. Triphon in the Rhone Valley almost without and another from Cyprus with only two small ones. The shade of the pale form varies from pale lemon to almost white; the spotting of the border varies as in the type form, but the tendency to fewer and smaller spots is more pronounced. One from the Pyrenees has a very broad black border with only tiny spots. Specimens of this form are from England, France, Switzerland, Italy, Corsica, Greece and Palestine. The English and Corsican examples are the smallest.

C. hyale.—There is only one English specimen (we much want more). There is very little variation in the ♂s, but the colour is occasionally rather paler, especially in one from Aix. That of the ♀, though generally nearly white varies from that to pale yellow, but very few of the specimens reach the *inversa* form. The two best are from the Tyrol and La Grave, and one approaching these from the Rhone Valley and another from Fiesole. The breaking up of the black apex by coalition of the yellow spots (ab. *apicata*) is rather common at Aix-les-Bains, and there is a very pronounced case, as well as the only ♀ instance, from Mürren, but it is not rare anywhere. A ♂ from Sarepta has very broad black tips with small spots.

G. rhamnii.—There is practically no variation in this species, but the southern specimens are slightly larger than ours; there is a small ♀ from Val d'Iliez and a ♂ of unusually bright colouring from Hinterzarten in the Black Forest.

D. paphia.—There is very little difference between English specimens and those from Central Europe even in size, but further south they are slightly larger; the finest here are from Digne, the Leventina and the Val Maggia. There is frequently a pink or mauve tinge in the silver of the underside, but this tends to fade out though traces generally remain. There are specimens of the *valesina* form of the ♀ from the New Forest and also from the Rhone Valley, South Switzerland and Digne. They vary in the intensity of the black suffusion and also in the tint of the ground colour; the five specimens from the New Forest show nearly all the differences displayed by the other specimens. Both the specimens from the Rhone Valley are small. Those from South of the Alps are large. In the Leventina this is the commoner form and in the Val Maggia I have never met with any other. The Corsican form, *immaculata*, are generally quite without silver or only show the slightest traces, the pattern is generally traceable as a sort of damask, but is sometimes wholly obscured. Several of these specimens had lost the upper part of the antennae, always of equal length. I have come across the same peculiarity in *B. pales* on the Dent du Midi. It is a very remarkable fact that while the loss of any part of the antennae in a normal insect seems to cripple it completely, those that are "born so" do not seem to suffer any inconvenience, and certainly fly about quite actively. Specimens of *D. paphia* from N. Africa occur without silver but with the whole wing washed with a golden shade; this form (*dives*, Obth.) is not racial, however, as the usual form also occurs, differing only in its great size. Some of the Corsican *immaculata* have much the same appearance, but all Corsican specimens are small. I have seen the *valesina* colouring in Corsican *immaculata*, but there is no example here.—(To be continued.)—Rev. GEO. WHEELER, M.A., F.R.E.S.

RECORDS AND FULL DESCRIPTIONS OF VARIETIES AND
ABERRATIONS.

Exhibited at the Annual Exhibition of the South London Entomological Society.

Compiled by S. G. CASTLE RUSSELL and H. J. TURNER for publication in the *Entomologist's Record* and in the *Proceedings* of the Society.

MR B. W. ADKIN.—*Parasemia plantaginis*, L. A cabinet drawer showing considerable variation and a novel method of arrangement. *Polygonia c-album*, ab. *dilutus*, Fwk., ab. *suffusa*, Fwk., a var. with blue spots on hindwings and two barred vars. *Aglais urticae*, L. Three ab. *nigra*, Tutt, two ab. *alba*, Cosm., one ab. *semi-alba*, Fwk., two *semi-nigra*, Fwk., one with deep black margins figured by Frohawk and another. *Nymphalis polychloros*, L., one pale, one figured by Frohawk, one with spots on hindwings, and one with broad border. *Nymphalis io*, L., two ab. *semi-ocellata*, Fwk., one ab. *exocellata*, Weym., and one with black ocelli. *Vanessa atalanta*, L., one with narrow band, one with forewings suffused with red, one with brick red bands and one with pale bands. *Vanessa cardui*, L., one ab. *inornata*, Brams., one pale, one suffused, and one with five spots on forewings.

MR H. W. ANDREWS.—A large number of Diptera with wing markings, to illustrate a paper read 11th September 1941.

DR K. C. BLAIR.—(1) A living Longicorn beetle a native of Southern Europe, *Morimus funereus*, Muls., the specimen was previously exhibited by Mr T. R. Eagles at the meeting on the 8th May last, and has since fed on twigs of various trees, oak, sallow, ash, hawthorn, etc. It was found in a garden at Enfield shortly before that date. (2) Living specimens of the so-called bee-louse described by Kirby in 1802, recently hatched from the eggs of the oil beetle, *Meloë violacens*, Marsh. The eggs were obtained in June by Mr Hugh Main, so the little larvae will have to hibernate before the time of their normal appearance on flowers in April and May. From these they get carried by bees into their nests, in which they undergo the rest of their metamorphosis. (3) Carded specimens of the triungulin larvae of *M. violacens*, Marsh, and *M. proscarabaeus*, L., for comparison, together with the adult beetles.

DR B. M. BLOOD.—*Hymenoptera parasitica* (Chalcididae), a folio of drawings and microscope slides.

MR A. A. W. BUCKSTONE.—*Polygonia c-album*, L. a long series bred from Ashted ova, September 1941; the ground colour of uppersides being pale brown inclining to yellow and quite distinct from either the dark brown of the normal autumn brood and the lighter colour of the summer generation. The markings of the undersides took the usual autumn form, but the colour in the majority of the insects was brown instead of the usual black. The parents from which the ova were obtained were of the usual summer form, ab. *hutchinsoni*, Robs., and over 1000 butterflies emerged, of which only 31 were of the typical autumn form. *Argynnis (Brenthis) euphrosyne*, L. from Ashted, Surrey, 19th June 1941. A female, upperside almost entirely black. A male, upper-side cream colour. A male, underside markings very indistinct. *Aricia agestis*, Schiff. (*astrarche*, Bergstr.), a series from Fetcham, Surrey, May and August 1941, showing variation in the number, size, and ar-

rangement of spots on the undersides. *Apocheima hispidaria*, Schiff., taken at Epsom, 18th March 1941, having the forewings yellow in colour and being of an exceptionally large size. A series bred from Wimbledon larvae which varied in colour from typical to deep black. Living larvae and pupae of *Colias croceus*, Frery., from Fetcham ova.

DR G. V. BULL.—A series of *Zygaena filipendulae*, L., with three confluent vars. A completely xanthic example of *Maniola jurtina*, L.; a *Pieris napi*, L., ♀ with a very faint blotch on left forewing; two *Heliothis peltigera*, Schiff., bred from ova laid by a ♀ taken on Valerian at dusk in his garden, 25th June. The ova hatched 3rd July, and the first imago emerged 7th August.

COLONEL V. R. BURKHARDT.—*Argynnis euphrosyne*, L., a yellow male (upperside). A male *Argynnis paphia*, L., almost entirely black, a similar female and several forms of male and female ab. *confluens*, Splr., the black male and female are referable to ab. *melaina*, D'Aldin. *Limenitis camilla*, L., several forms of *semi-nigrina*, Fwk., and an underside of *nigrina*, Weym., *Argynnis aglaia*, L., a male example of ab. *charlotta*, Haw., and several undersides with additional silver markings, and two with all silver markings absent. *Plebejus argus*, L., a lilac-tinted male and one with the greater area tinted lilac; an ab. *striata*, an intersex, ab. *sagittata*, and other forms. All the specimens from the New Forest, 1941.

MR S. A. CHARTRES.—Aberrations of *Polyommatus (Lysandra) coridon*, Poda, including ab. *striata*, Tutt, ab. *radiata*, Corv., females, and male forms of ab. *livida* and ab. *pulla*, uppersides and undersides of ab. *digitata* and ab. *obsoleta*, Tutt, etc. *Polyommatus (Lysandra) bellargus*, Rott., a female with heavily radiated forewings (ab. *radiata*, Gasch); another example with six stripes on left forewing and one on each hindwing on a pearly white ground; another with elongated spots on all four wings on white ground colour, one with hindwing heavily radiated, one with six radiations on each forewing and one with six radiations only on left forewing. Also a male with six radiations on each forewing, and an ab. *obsoleta*, Tutt. *Polyommatus icarus*, Rott., a female with broad white border extending around outer margins and bases of forewings. *Satyrus galathea*, L., a specimen with forewings nearly suffused with black, lunules on hindwings grey; another with black border of hindwings very deep and the white lunules entirely missing. *Argynnis selene*, Schiff., an aberration with black spots on forewings joined, forming two heavy blotches, another with radiated markings on all wings, and one with heavily marked borders to all wings. *Aglaia urticae*, L., an example with costal spots united, the white spots being enlarged and with melanic hindwings, another with heavily banded forewings and one with elongated blue lunules. *Syrictus malvae*, L., var. *taras*, Meig., and aberrations of *Maniola jurtina*, L. All the above insects were taken in East Sussex and at Royston, Herts., in 1940-41.

MR H. H. CLARKE.—*Argynnis paphia*, L., two male forms of ab. *confluens*, Spul. A male with black central areas and border spots forming streaks, a female heavily blotched with black and a male also blotched with black. *Limenitis camilla*, L., a *semi-nigrina*, Fwk., all from the New Forest, 1941.

MR F. D. COOTE.—Aberrations of *Mimas tiliae*, L., taken at Carshalton.

MR W. G. FINNIGAN.—Lantern slides and photographs of various natural history objects.

MAJOR FREMLIN.—Aberrations of *Aglais urticae*, L., bred some 40 years ago, showing the effect of various acids and fumes to which the larvae and pupae had been exposed.

MR F. T. GRANT.—Exhibited the following Coleoptera: *Ontholestes murinus*, L., found on and in garden vegetable refuse, 21st June-22nd September 1941 (plentiful). *Ontholestes tessellatus*, Geoff., found on and in garden vegetable refuse, 7th July to 22nd September 1941 (14 taken).

DR H. G. HARRIS.—*Limenitis camilla*, L., ab. *nigrina*, Weym., ♂; *Argynnis paphia*, L., f. *valezina*, Esp., ab. *confluens*, Splr., and a cabinet drawer showing specimens of *Maniola jurtina*, L., arranged to illustrate the various degrees of aberration, mostly females.

MR C. N. HAWKINS.—Communicated the following notes on his exhibit: "On the 9th November last year I exhibited two melanic *Ennomos quercinaria*, Hufn., and 12 non-melanic specimens (3 females and 9 males) of the same brood bred from ova of a strain initiated by Mr Frank Lees in 1934, and I then said there was a suggestion that the heterozygote of the melanic form was that with very heavily shaded cross lines, since that was the one which had always been selected as the non-melanic parent in different generations of this strain, which otherwise had had to depend for its continuation on two very fortunate 'chance shot' pairings in two successive years. I also said that I had good batches of eggs from both the melanic females which had been associated with some of the well-shaded males of the same brood (some of the 12 non-melanic males mentioned above) and that I hoped to find out something more definite about the heterozygotes in due course (see our *Proceedings* for last year (1940), pp. 17/18). The ova proved to be fertile, but many failed to hatch and only 9 larvae (all of one brood) reached maturity and pupated. One pupa and a male died and the remainder produced the specimens shown, i.e. two melanic females, four non-melanic females, and two non-melanic males. It will be noted that one of the non-melanic females is a very pale specimen almost without brown irroration, and with no trace of dark shading to the cross-lines while the others, and the two males, vary in the amount of irroration and shading. They are indistinguishable, in fact, from specimens of a non-melanic strain and since these non-melanics must of necessity be heterozygotes for melanism it is clear that this melanic form is a true recessive and that the heterozygotes cannot be distinguished from normals. In view of this it is a very remarkable coincidence that the heavily shaded non-melanics, selected for breeding purposes in this strain, have so often proved to be, in fact, heterozygous for melanism. The presence of the two melanic females in the brood now shown serves to emphasize this point."

CAPT. R. A. JACKSON.—*Maniola jurtina*, L., a series showing pale forms, one xanthic, a ♂ and a ♀ with ground colour fawn. They were taken on high ground near Bishop's Waltham. *Aphantopus hyperantus*, L., a short series of undersides showing the variation in markings which

has occurred this summer (1941). *Pararge aegeria*, L., three ♀♀ var. *egerides*, Stdgr., from Forest of Dean of the first brood with large wings and very bright coloration. *Coenonympha pamphilus*, L., two large females from Dorset where the females appear to be much larger this year. *Argynnis (Brenthis) selene*, Schiff., an underside male aberration and two second brood specimens taken 31st August. *Argynnis aglaia*, L., a pair showing darkening of the basal area. *Polygonia c-album*, L., one with the C almost missing and the other with it very prominent and forming almost a closed circle. *Acosmetia caliginosa*, Hbn., a series of wild taken forms from S. Hants, 2nd, 8th, and 15th June. *Plusia chryson*, Esp., four specimens bred from Test Valley larvae. *Monima (Taeniocampa) populi*, Fb. (*populeti*, Hb.), a series from the exhibitor's garden showing variation in ground colour from pale to dark.

MR F. V. L. JARVIS.—*Pieris napi*, L., a series illustrating the connection between pattern factors and hibernation factors from his own experiments in this direction. (See *Proceedings of South London Entomological Society*, 1941-2.)

On behalf of Mr J. Newton of Sunderland, Mr Jarvis exhibited plates and descriptions of a brood of *Aglais urticae*, L., prepared from details supplied him:—"On 5th July 1941 fourteen young larvae were collected from a web and reared under normal conditions on nettle. Pupation took place between 20th and 25th July. Emergence began on 14th August. The first seven imagines were dark orange-red with heavy markings. Amongst them was the ♀ ab. C, which is referable to *polaris*, Stdgr., with additional dusky shading between the second and third black costal blotches. Then on 17th August, at 2 p.m., ab. A emerged, followed shortly by ab. B. A heavy thunderstorm was in progress but no significance is attached to this fact. Both specimens were slightly deformed in the hindwings. A and B are extreme modifications of the form *ichnusoides*, Selys-Lng., and *nigra*, Tutt, respectively, and in addition to the obvious markings show the following peculiarities: ab. A ♀: lunules (on hindwings only) are pale lilac with a corresponding dull lilac continuous band on the underside. The under surface is mainly blackish brown with the exception of a pale buff blotch in the centre of the forewings. Ab. B ♂: upper surface—The apical spot is pale blue followed by four deeper blue blocks. The heavy black submarginal band extends along the hind and inner margin to the base of the wings. Hindwings have a purple sheen. Under surface—Forewings almost normal but hindwings are a fairly uniform dark brown. The remaining five pupae failed to emerge and nothing could be ascertained about their possibilities. A suggestion is that these five carried lethal genes especially as the two extreme forms were slightly deformed. Mr Newton, however, does not support this view, but gives a verdict of 'accidental death' as he had to remove all the pupae from the cage to take on a vacation. However this brood is of unique interest as it is an authentic record of the relationship between these extreme aberrations, the commoner ab. *polaris* and the normal form. Possibly it is a pairing between one individual carrying a melanic (*polaris*) factor and another with a 'radiata' factor; the combination of these factors allowing the other recessive factor to become apparent."

[Note by S.G.C.R.—The fact of the thunderstorm occurring during emergence is interesting, and I think should be taken into considera-

tion in view of the known influence of thunderstorms on other species.]

MR H. A. LEEDS.—35 specimens of *Polyommatus icarus*, Rott., *Aricia agestis*, Schiff., and *Plebejus argus*, L., coinciding with aberrations described in pages 139 and 140 of the *L. coridon* "Monograph;" and 20 *Lycaena phlaeas*, L., mostly taken prior to 1941. Also 18 *Strymon pruni*, L., captured in 1941: ♂ uppersides, abs. *progressa*, Tutt; postsinis-decrescens; major and minor. ♀ uppersides, abs. *excessa*, Tutt; aurosa; postsinis-aurantiaextensa; major and minor. Homoeosis, the second division of right hindwing with a patch of underside bright scaling and white edged black spot reproduced on upperside. ♂ underside, ab. postdex-transformis. ♀ undersides, abs. *fulvescens*; *pallidula-fulvescens*; *postsinis-partimflavescens*; *postsinis-sagittata*; *postsinis-decrescens*; ♂ and ♀ postdex-lutescens. Except where "Tutt" is shown the terms are from "Monograph of *coridon*." (Tutt's sizes for *Strymon pruni*, of major, above 32 mm., and minor, below 25 mm., are unsuitable, quite one-third taken *wild* exceed 32 mm., whilst my smallest are: ♂ 25 mm., ♀ 26 mm., and only one of each during 50 years' collecting in Hunts. Those exhibited were based on: major, ♂ above 34 mm., ♀ above 36 mm.; minor, ♂ below 28 mm., ♀ below 30 mm. Mr Leeds advocates that these revised limitations be recognized.)

MR H. MAIN.—Triungulin larvae of *Meloë violacens*, Marsh. The eggs were deposited last spring and the larvae will have to wait until next spring for their further development.

THE REV. J. N. MARCON.—*Argynnis paphia*, L. Seven examples of confluent forms and three melanic specimens referable to ab. *melaina*, D'Aldin. *Limenitis camilla*, L. (*sibilla*, L.), one ab. *nigrina*, Weym., and one *semi-nigrina*, both species from the New Forest, 1941. *Brenthis* (*Argynnis*) *euphrosyne*, L., a confluent form. *Brenthis* (*Argynnis*) *selene*, Schiff., four aberrations: both species from Sussex. *Argynnis cydippe*, L. (*adippe*, L.). A heavily banded female from the New Forest, 1940. *Euphydryas* (*Melitaea*) *aurinia*, Rott., a melanic female bred 1940. *Aglais urticae*, L., an extreme form with a continuous black wedge extending in a triangle from the first black costal spot in discal cell right round to the inner margin. *Maniola jurtina*, L., three xanthic forms, two ♀♀ and one ♂, Sussex, 1940-41. *Coenonympha pamphilus*, L., a homoeotic example, Sussex, 1940. *Lysandra* (*Polyommatus*) *coridon*, Poda. Six examples of ab. *fowleri*, South; males: one ab. *plumbescens*, Tutt, ♂, one ♂ ab. *livida*, Tutt, ♂ and ♀ ab. *glomerata*, Tutt, one ♂ ab. *alba*, Tutt. *Polyommatus icarus*, Rott., ab. *striata*, Tutt, ♂ (*radiata*, Rebel). *Lysandra bellargus*, Rott., an extreme radiate female ab. *striata*, Tutt, with white ground. The radiations on the forewings extending from the obsolete border almost to the base of the wing; the radiations on the hindwings are small. Another example has the radiations only half developed. Another female with brown ground colour, had long radiations on the hindwings and short ones on the forewings. All above from Sussex, 1940-1941.

MR A. N. MORLEY.—Aberrations of *Lysandra* (*Polyommatus*) *coridon*, Poda, taken at Folkestone and near Maidstone, including a melanic male upperside, a melanic male underside and a male ab. *biarcuata*, Tutt. *Boarmia rhomboidaria*, Schiff. (*gemmaria*, Brahm.). Males and females of the form ab. *australaria*, Curt., and five examples of the

black form ab. *rebeli*, Aign. Nine examples of *Bryophila* (*Metachrostis*) *muralis*, Forst. (*glandifera*, Hb.) from Romney Marsh.

MR L. W. NEWMAN.—*Colias croceus*. Varieties of this species and one ab. *helice*, Hb., of the *obsoleta* form. All caught in the lucerne fields, Bexley, in September.

MR G. B. OLIVER, on behalf of Mr G. H. OLIVER.—A few recent captures. *Argynnis* (*Brenthis*) *selene*, Schiff. An extreme ♂ aberration of the normal forewing spotting, only the second and fourth costal remain, the costa beyond the latter clouded with black lunules elongated and spotless. Hindwings: Basal two-thirds black, outer third with large black lined lunules. Underside: Forewings unevenly marked with black blotches, hindwings olive buff with large silver lunettes, the whole area rayed by the dark veinings; Hants. *Coenonympha pamphilus*, L. A pale creamy buff male, Middlesex. *Pieris napi*, L. A male with all normal black markings on fore and hindwings replaced by greyish-brown (as in ab. *ganerew*, Frwk., *Leptidea sinapis*, L.), Bucks.

MR L. G. PAYNE.—A collection of native British Ferns in a large picture frame.

MR A. J. PONCHAUD.—An extreme form of *Lysandra* (*Polyommatus*) *coridon*, Poda, with radiations on all four wings (ab. *radiata*), Salisbury district.

MR C. G. PRIEST.—A series of British Lepidoptera bred and captured during the season of 1941.

MR A. RICHARDSON.—Six drawers of British Lepidoptera taken or bred in 1939-40-41:—(1) A bred series of 40 *Parascotia fuliginaria*, L., with two preserved larvae, Berks. Bred series of three *Agrotis lucerneae*, L., and one larva, Conway. Series of 90 *Agrotis ashworthii*, Dbldy., and two larvae, bred from wild larvae taken at Conway, April 1940. Bred series of 36 hybrid *Lycia hirtaria*, Clrck., ♂ (London) × *Nyssia zonaria*, Schiff., ♀ (Conway). Bred series of eight (four ♂ and four ♀) hybrid *Poecilocampa lapponaria*, Bdv., ♂ (Perth) × *L. hirtaria*, Clrck., ♀ (London). Bred series of eleven *Ortholitha umbrifera*, Prout, and one larva, forced in December 1939, from the Forest of Dean larvae. A melanic *Acronicta psi*, L., larva taken at Rannoch, September 1940; first recorded specimen from that locality.

(2) Series of 25 *Ectropis consonaria*, Hb., ab. *waiensis*, Rchsn, and including for comparison two typical specimens, Forest of Dean. Series of *E. consonaria*, Hb., ab. *nigra*, Bnks., Gloucester. Bred series of *Boarmia repandata*, L., ab. *nigra*, Tutt, Delamere, with eight bred specimens from Rannoch and Forest of Dean for comparison, also two ab. *conversaria*, Hb., bred from Loch Maree. Series of twelve *Ectropis crepuscularia*, Hb., ab. *nigra*, Th.-Mg., Gloucester. Series of twelve *E. crepuscularia*, Hb., ab. *delamerensis*, B. Wht., Delamere. Series of seven *Perizoma blandiata*, Schiff., taken 11th August 1941, Forest of Dean (second brood ?), with fourteen taken at Rannoch, 15.vi.39, and seven taken in N. Wales, 12.vi.38, for comparison. Series of nineteen each of *Ortholitha umbrifera*, Prout, and of *O. mucronata*, Scop., taken on the same ground in the Forest of Dean on 18th June and 25th July respectively. Series of *Lampropteryx otregiata*, Metcl., South Devon. A specimen of *Lygria suffumata*, Schiff., ab. *porrittii*, Robs., taken in

the Forest of Dean and two intermediates bred from the same. A very heavily black-banded aberration of *Chloroclysta siterata*, Hufn., Forest of Dean. A series of seven *Perizoma taeniata*, Steph., Witherslack. A specimen of *Psodos coracina*, Esp., Braemar. A series of 43 *Hydriomena ruberata*, Frr., taken off pollard willow trunks in Gloucestershire.

(3) A series of 250 *Erannis leucophaearia*, Schiff., picked off tree trunks on Sunday, 25th February, 1940, in the Forest of Dean and including 90 ab. *merularia*, Weym.

(4) A series of 45 *Oria musculosa*, Hb., taken in Salisbury district, 1st and 2nd August 1940. A series of ten *Oligia (Miana) versicolor*, including first two British specimens both melanic varieties, Forest of Dean, Oxford and Norfolk Broads. Typical specimen of *O. (M.) literosa*, Haw., ab. *aethalodes*, York. Series of five *Bryophila muralis*, Forst., ab. *impar*, Warr., Gloucester. Two specimens of *Heliothis dipsacea*, L., from Salisbury and the Breck. Series of three *H. maritima*, Gras., Dorset. Series of over 130 *Sarrothripus revayana*, Scop., picked from 900 beaten out in the winter of 1940-1, chiefly in Gloucester, and including abs. *ramosana*, Dup., *stonianus*, Curt., *atrata*, *brunnescens*, *lichenodes*, *canescens*, *dilutana*, Hb., *ilicana*, Fb., *rubescens*, *nigripunctata*, *rosea*, *afzeliana*, *adusta*, *nigricans*, and *melanosticta*. Series of 23 *Epione vespertaria*, Fb., York. Series of 18 *Zygaena achilleae*, Esp., Argyle. Series of 18 *Z. exulans*, Hoch., Perth. Series of 18 *Z. purpuralis*, Brün., N. Wales. Series of eight *Coenonympha pamphilus*, L., also five cream-coloured and one with white patches, Forest of Dean, and two with aberrant spots on underside of forewings from N. Wales. One specimen of *Adopoea thaumas*, Hufn., ab. *intermedia*, Tutt, Dover. One specimen of *Polyommatus coridon*, Poda, ab. *syngrapha*, Kef., Stroud. Two specimens of *Aricia agestis*, Hb., var. *artaxerxes*, Fb., Rannoch. Series of four *A. agestis*, Hb., Witherslack. One specimen of *Leptidea sinapis*, L., ab. *ganerew*, Frwk., Forest of Dean. One specimen of *L. sinapis*, L., ab. *erysima*, Bork., Forest of Dean. Two *Polygonia c-album*, L., vars. one copper coloured and one with melanic hindwings, Forest of Dean.

(5) Bred series of 20 *Drymonia chaonia*, Hb., New Forest. Bred series of 18 *Spilosoma urticae*, Esp., Norfolk Broads, also a spotless specimen taken at Wicken. Bred series of 20 *Callimorpha dominula*, L., ab. *bimacula*, Oxford. *Acronicta menyanthidis*, View., Rannoch. Series of four *Acronicta myrica*, Gn., taken and bred, Rannoch. A pale aberration of *Noctua rubi*, View., York form, taken at Wicken. Bred series of twelve *N. ditrapezium*, Bork., and two larvae, Witherslack, and a bred specimen from Conway. Bred series of twelve *N. triangulum*, Hufn., and one larva, Conway. Series of twelve *N. stigmatica*, Hb., and two larvae, Oxford. Two specimens of *Catocala sponsa*, L., New Forest. Series of 34 *Triphaena comes*, Hb., abs. *curtisii*, Newm., *rufa*, Tutt, etc., bred from wild Forres larvae.

(6) Bred series of four *Triphaena fimbriata* Schreb., Stroud. Two specimens of *Agrotis raveda*, Hb., Oxford and Lincoln. One specimen of *Leucania unipuncta*, Haw., taken in bred condition in S. Wales on 15th October 1938. Two bred specimens of *Callimorpha dominula*, L., ab. *bimacula*, with defective black scales giving a mottled appearance. A series of twelve *Xylomiges conspicillaris*, L., including one ab. *intermedia*, Tutt, and a series of six *Mamestra rectilinea*, Esp., Rannoch.

A series of 40 *Phothedes captiuncula*, Tr., Arnside. A series of 28 *Tapinostola hellmanni*, Evers., Lincoln. A series of 20 *Arenostola brevilinea*, Fenn., Norfolk Broads. A varied series of 20 *Gypsitea leucographa*, Hb., including an obsolete specimen, Forest of Dean. Series of 15 *Cosmia paleacea*, Esp., from York, with three from Aviemore for comparison. Series of 13 *Atethmia xerampelina*, Hb., N. Wales. A series of *Dasycampa rubiginea*, Fb., Berks. A series of 15 *Xanthia croceago*, Fb., and one larva, taken and bred from Forest of Dean. Two specimens of red form of *T. gracilis*, Fb., New Forest. A series of four *Plusia bractea*, Fb., Forres. A series of *P. chryson*, Esp., Hants.

MR C. RIPPON.—A brood of *Callimorpha* (*Panaxia*) *dominula*, L., containing some unusual aberrations. The exhibit consisted of the greater part (45 specimens) of a brood sixty in number bred from ab. *medio-nigra* ♀ captured wild; so the male parent is unknown. Of the 60 imagines, 18 were typical, 16 *medio-nigra*, 16 "B" and 10 "A". "B" closely resembled the form to which Dr Cockayne originally gave the name of *basi-nigra*, Cykn., the only white spots on the upper wing being in the apical area, small in size and in some cases only two in number; the under wing was similar to that of *medio-nigra*. In "A" the upper wing was like that of "B" except for a triangular orange spot midway along the wing near the costa, while the underwing resembled that of the type. The black in the underwings tended to be heavy in the whole brood, especially in the "B" form.

MR S. G. CASTLE RUSSELL.—*Argynnis* (*Brenthis*) *euphrosyne*, L. A melanic male form, fore and hindwings heavily suffused and clouded with black, N. Forest, 1941. *Argynnis paphia*, L. Seven male forms of ab. *confluens*, Spul. Two males suffused with black referable to ab. *melaina*, D'Aldin. A female form of ab. *confluens* and two females heavily clouded with black (ab. *melaina*). *Limenitis camilla*, L. A male and a female *nigrina* and three *semi-nigrina*. *Argynnis cydippe*, L. (*adippe*, L.). Two underside forms. *Plebejus argus*, L. A female underside ab. *striata* and other underside forms. *Pararge megera*, L. A very pale straw-coloured male. All above from New Forest, 1941.

MR W. R. SHERRIN.—A very interesting collection of British grasses.

MR J. A. STEPHENS.—British Coleoptera. A. Taken in the Chatham area between 1939 and October 1941 in a well-wooded and secluded place on a farm. *Paganaeus bipustulatus*, F., *Amara anthobia*, Va., both rare: taken under stones, etc.; *Opilo mollis*, L., rare (hawthorn blossom and hazel); *Pogonochaerus dentatus*, Fc. (old ivy); *Stilicis fragilis*, Gr., in abundance; *Acidota crenata*, F. (one specimen); *Pseudopsis sulcata*, Nw.; *Agathidium rotundatum*, Gy.; *A. nigrinum*, St.; *Xylophilus populneus*, Pz. (two specimens), all being rare. *Epipolus caliginosus*, F. (one only), usually found only in London district. Found hibernating in a large heap of straw in the winter of 1940-41.

B. Taken on growing potatoes in the town allotments, etc. *Homalopia ruricola*, F., local and rare. *Langelandia anophthalma*, Ab. This very rare species was first discovered by the Rev. Theodore Wood at St Peter's, Broadstairs, in potatoes: then after 50 years I found it in my own back garden under roots of flowers and at the bottom of decayed chestnut fencing in 1935 (two specimens), and in the following years in plenty. The present exhibit was taken only a few days before the ex-

hibition. It has also been taken recently in Windsor Park by Mr Donisthorpe. *Anomonatus 12-striatus*, Ml., found in company with the above. *Bembidion 4-maculatum*, L., rare; taken in the bed of a dry stream, Borstal.

C. The following were taken in Cobham Park. *Pogonochaerus bidentatus*, Th. *Trachodes hispidus*, L. *Thanasimus formicarius*, L., taken under bark of a small fallen oak branch. *Throscus carinifrons*, Bon., rare. *Liodes cinnamomea*, Pz., rare, from leaves under above branch. *Hernoticus serratus*, Gy. (one only), very rare (hornbeam). *Aulonium trisulcum*, Gf. (elm). *Synchita juglandis*, F. (one only), very rare (beech), from under bark of trees. *Leptura scutellata*, F. (hornbeam). *Platycis minuta*, F., rare (beech). *Platypus cylindrus*, F. *Cychrus rostratus*, L., in decaying hornbeam. *Sphindus dubius*, Cy., found in old tree stumps. *Prionus coriarius*, L., from the heart of a large ash tree when being felled. *Coenopsis fissirostris*, Wa., from under leaves. *Tritoma bipustulata*, F.; *Triplax lacordairea*, Cr.; *Diphyllus lunatus*, F., and *Orchesia undulata*, Kr., all rare, found in fungi. *Podabrus alpinus*, Pk.; *Stenochorus meridianus*, Pz. (blackthorn); *Balaninus glandium*, Mm. (oak); *Rhagonycha translucida*, Kry., from beating. *Dirrhagus pygmaeus*, F., very rare (one only); this has not been previously taken in Kent; by sweeping ferns and short herbage. *Smicronyx reichei*, Gy., rare; sweeping herbage at Darent Wood. *Lestiva pubescens*, from Sandling near Maidstone. *Hydrous piceus*, L., from Gravesend; *Aromia moschata*, L., from Snodland.

MR H. G. TUNSTALL.—*Argynnis paphia*, L. Three males, three females, and three examples of var. *valezina*, taken in the New Forest, 25.7.39; *Brenthis* (*Argynnis*) *euphrosyne*, L., a specimen with cream patches on the forewings, taken at Box Hill, 4.6.39; *Aricia agestis*, Schiff. (*astrarche*, Brgstr.), an example of var. *salmacis*, St., taken at Epsom, 9.9.41; *Laspeyria* (*Aventia*) *flexula*, Schiff., one bred from Box Hill larva, 12.6.39, and another from Ashted larva, 15.6.39. He also showed a copy of an old cartoon entitled the "Entomologist." The figure was made up of wings, legs, bodies, etc., of various orders and of various stages.

[Note by S.G.C.R.] This cartoon is one of three published by C. Tilt, Fleet Street, January 1830. G. Spratt del. Printed by G. E. Madeley. The other two are entitled the "Conchologist" in which the figure is made up of shells, and the "Mineralogist" in which the figure is made up of various minerals. I possess a copy of each.

The face (side view) is a pleasant youthful one, the only human element. The head is covered by a large grasshopper as a cap with extended forward antennae; at the back of the head is a long bodied dragonfly perched below the bent hind legs of the grasshopper and with half extended wings and curved abdomen. Covering where the ear should be is a large dark beetle. The neck is hidden by a larger beetle with a row of black spots on each side of the elytral suture. It has a black head coming below the chin of the face. The two arms are much magnified larvae, one dominated by green colour, the other by red and black. Each arm is extended, one forward the other half backward; each holds an old-fashioned implement of capture. The whole body is made up by a huge *caja*, right wing extending to the right knee, which is marked by a bronze beetle; the left wing reaches to the left shoulder

but covered by a sort of Saturniid moth, which forms a V-shaped waist-coat over the chest. The left thigh and knee are formed by a non-descript fly, whose body covers the knee. The portion below these limbs is formed by the black yellow-banded bodies of Hymenoptera simulating banded stockings and swathed in flimsy wings. These two limbs are settled on beetles for shoes, one a blue-black and the other a red-black beetle. The superscription is: The Entomogist. Published by C. Tilt, Fleet Street, January 1830. G. Spratt del. Printed by G. E. Madeley.

MR HY. J. TURNER.—A few of the more common Rhopalocera from the Island of Java (Indo-Malay Region). *Papilio memnon*, L., a very widespread species in this Region. The ♂ is tail-less in the whole area and practically without local variation whereas the ♀ is extraordinarily variable and usually tailed. In Seitz's work some 30 different forms of ♀ are described. The Java ♀ form, *achates*, Sulz., is a large conspicuously marked tailed form. In the adjoining island of Borneo the form there is a tail-less one. *Papilio paris*, L., is tailed in both sexes; it is not so variable as the last except in and around the large and conspicuous green area of the hindwing and in the metallic dusting of the wings. It is extremely common generally in the Region. The Javan form is ssp. *gedeensis* Fruh., a rather plain form. *Papilio helenus*, L., is a very plain black and white species; the discal area of the hindwing has a large tripartite white area. It is a very common forest insect. The Javan form is ssp. *enganius*, Doherty., and occurs in Borneo and Sumatra also. Of the two Pierids shown *Anaphaeis java*, Sprm., is a species which shows considerable local and seasonal variation. The underside of the Javan form *magniplaga*, Fruh., is strikingly coloured. The other Pierid is the plain yellow *Salatura panda*, Godt. On other islands this species varies in depth of ground colour and also in the varying extent of the black borders.

MR S. WAKELY.—Exhibited the following species which had been taken or bred during the present season. A series of *Spilosoma lutea*, Hufn. (*lubricipeda*, L.), from Clapton, London, many of which showed markings approaching ab. *fasciata*; *Orthosia xerampelina*, Hubn.; *Crambus contaminellus*, Hubn.; *Polychrosis littoralis*, Curt.; *Laspeyresia woeberiana*, Schiff.; *Carcena quercana*, Fabr.; *Mompha propinquella*, Staint.; *Elachista cerusella*, Hubn.; *Ornix guttea*, Haw., and *Tinea misella*, Zell. (*insectella* Fb.), all from Norwood. *Peronea aspersana*, Hubn.; *Polychrosis fuligana*, Haw.; and *Leucoptera lotella*, Staint., from the Ashted Field Meeting, and a series of *Depressaria carduella*, Hubn., the pupae of which had been sent to him by Mr L. J. Ford from the North of England.

LIEUT. N. A. WATKINS.—*Polygonia c-album*, L., a ♀ var. *hutchinsoni*, Robs., Somerset, August 1934, upperside ab. *nigra*, underside ab. *sagitta-album*, Frwk., 1938; this is the form figured by Frohawk and described by him in "Varieties of British Butterflies," 1938, figs. 2-3, p. 103. The references in that book are erroneous, and should read as above. A ♂ ab. *semi-nigra*, Forest of Dean, 1934; and a thinly scaled form giving a purplish shade to the upperside, bred Somerset, 1938. *Aglaïs urticae*, L., a ♂ ab. *nigra*, Tutt, extreme form, Bucks, 1935; a ♂ ab. *nigra*, Wilts. Downs, 1939; a ♀ *semi-nigra*, Ireland, 1916, and a ♂ ab. with both forewings and one hindwing white, remaining hindwing normal, 1938, Wilts. *Melitaea athalia*, Rott., a ♂

ab. *eos*, Haw., E. Kent, 1936; a ♂ ab. *navarina*, Selys-Long, Essex, 1937. *Brenthis* (*Argynnis*) *euphrosyne*, L., with red rust coloured underside, N. Devon, 1941; a melanic ♂ form, Northants. *Brenthis* (*Argynnis*) *selene*, Schiff., a ♂ ab. *margo-striata*, Fwk., N. Cornwall. This is figured by Frohawk in "Varieties of British Butterflies," plate 24. A ♂ ab. *margo-striata*, S. Cornwall, 1839; both from a small sized race, the males of which have a tendency to this form and the females to melanism. *Euphydryas aurinia*, Rott. ♂ and ♀ forms from Wilts and N. Devon, including a melanic male (Wilts) and a unicolorous ♂ ab. *fasciata*, N. Devon. *Argynnis aglaia*, L., a ♂ ab., New Forest, both forewings and one hindwing heavily splashed with white. *Heodes* (*Rumicia*) *phlaeas*, L., a ♂ ab. *alba*, a ♂ ab. *radiata*, a ♂ ab. *obsoleta*, Tutt, and a ♂ ab. underside with costal spots beginning to striate. All from N. Cornwall, 1939-40. *Aphantopus hyperantus*, L., a ♂ and ♀ ab. *caeca*, Fuchs, Wilts, a ♂ and ♀ ab. *lanceolata*, Shipp., N. Devon, a ♂ ab. *obsoleta*, Tutt. *Colias croceus*, Frery., a series of var. *helice*, Hb., colour ranging from *pallida*, Tutt, to *chrysothemiformis*, Vrtty., a ♂ and ♀ with discal spots on underside, lanceolate. *Plebejus argus* (*aegon*), Schiff., a gynandromorph figured by Frohawk in "Var. of Brit. Butt.," plt. 28, fig. 4. *Lysandra* (*Polyommatus*) *coridon*, Poda, a series including abs. ♂ *fowleri*, South, *ultrafowleri*, *striata*, Tutt, *juncta*, etc., and ♀ *semi-syngrapha*, *syngrapha*, *caeca*, *radiata*, *juncta*, etc., also two females with splashes of blue colouring. *Lysandra* (*Polyommatus*) *bellargus*, Rott., a series including ♂ *obsoleta*, Tutt, and extreme blue forms. *Lycaena arion*, L., a ♂ *obsoleta* upperside and two approaching *obsoleta*; three ♀ uppersides with bottom spot radiated (*I. nigrum*), a ♀ dwarf form underside, ab. *retrojecta*. *Polyommatus icarus*, Rott., a series including *caeca*, Tutt, and *striata*, Tutt, and some Irish forms. *Pieris napi*, L., a series including an albino ♀ bred Donegal, 1936, figured by Frohawk, plt. 37, fig. 1, forms of ab. *hibernica*, Schmid., and *citrona*, Fwk., banded forms from Donegal and Caithness, and extreme suffused and *bryoniae* forms, Caithness.

BARON DE WORMS.—(A) Series of British Lepidoptera taken and bred in 1941, including:—*Coenonympha tullia*, Mull. (*typhon*, Rott.), taken at Cairnsmuir, Galloway; *Hemaris tityus*, L. (*bombyliformis*, Ochs.), taken in the New Forest; *Sesia vespiformis*, L., bred Salisbury district; *Hepialus velleda*, Hbn. (*fuscinebulosa*, Dg.), taken in Galloway; *Bombyx rubi*, L., males from Salisbury area; *Callimorpha dominula*, L., bred from Salisbury district; *Eumichtis protea*, L., Salisbury; *Xylophasia polyodon*, Hufn. (*monoglypha*, L.), melanic examples taken in Galloway; *Xanthia aurago*, Fb., Salisbury area; *Acosmetia caliginosa*, Hb., taken in Hants; *Boarmia consonaria*, Hb., taken in Forest of Dean; *Scotosia transversata*, Hfn. (*rharnata*, Schiff.), from Salisbury, bred; *Thera variata*, Schiff., Salisbury area.

(B) Uncommon species and aberrations of (a) Butterflies taken and bred during 1941. *Apatura iris*, L., a male taken near Salisbury, 27th July, two males and one female bred from same area; *Pararge aegeria*, L., a male with yellow spotting from Wye Valley; *Maniola tithonus*, L., specimens with extra spots and one with bleached forewing; *Maniola jurtina*, L., examples of xanthic forms; *Eumenis semele*, L., a heavily marked form from Salisbury; *Lysandra* (*Polyommatus*) *coridon*, Poda, a ♂ ab. *fowleri*, a ♀ var. *syngrapha*, two unusually coloured males and

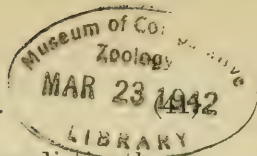
some *obsoleta* undersides; *Lysandra (Polyommatus) bellargus*, Rott., blue forms of the ♀ and abs. *ceronus*, *obsoleta*, Tutt, and *parvipuncta*, Aignr., undersides from Salisbury. *Polyommatus icarus*, Rott., an ab. with radiated stripes on all four wings (ab. *radiata*), Salisbury, 7th September; also lightly marked undersides; *Hesperia comma*, L., a ♀ with wings bleached on one side. (b) Moths.—*Agrotis simulans*, Hufn., a specimen taken in Salisbury, 7th September; *Taeniocampa gothica*, L., a dark ♀ form, Salisbury; *Catocala sponsa*, L., a ♀ form, New Forest; *Arctia caja*, L., a lightly marked ♂; *Taeniocampa munda*, Esp., spotless forms from Salisbury area; *Boarmia consonaria*, Hb., five examples of ab. *waiensis*, from Wye Valley.

(C) The following exhibits of Lepidoptera taken during 1939 and 1940 have already been reported in the "Proceedings." *Triphaena comes*, Hbn., a drawer illustrating the difference between the Northern and Southern races together with a series bred from a ♀ taken in Forres, 1939; *Callimorpha dominula*, L., a specimen bred in 1940 with albinistic colouring and devoid of black markings on hindwings; *Polyphlocia flavicornis*, L., an example taken in 1940 with heavy black markings, from Berks; *Lysandra (Polyommatus) coridon*, Poda, a ♂ with pale grey underside, ab. *obsoleta*, Tutt, taken in 1940.

Series of moths taken or bred during 1939:—*Noctua depuncta*, L., Forres; *Crymodes exulis*, Lef., f. *assimilis*, Dbldy., Rannoch; *Plusia bractea*, Fb., Forres; *Aporophylla lutulenta*, Bork., f. *luneburgensis*, Frr., Rannoch; *Moma alpium*, Osb. (*orion*, Esp.), Kent; *Eumictis (Epunda) lichenea*, Hb., bred, Swanage; *Noctua castanea*, Esp., Rannoch; *Agrotis cursoria*, Bork., Forres; *Larentia flavicinctata*, Hb., Rannoch; *Crocallis elinguaris*, L., Aviemore.

MR. N. G. WYKES.—A bred specimen of *Apatura iris*, L.; *Limenitis camilla*, L., an ab. *nigrina*, Weym.; *Maniola tithonus*, L., a bleached upperside and several with additional spots; *Maniola jurtina*, L., a ♂ upperside without forewing apical spot and various xanthic ♀ forms; *Plebejus aegon*, L. (*argus*, Schiff.); a series of underside minor forms; *Aricia agestis*, Hbn., a ♂ underside with obsolete border; *Lysandra (Polyommatus) coridon*, Poda. Many aberrational forms including: male uppersides—*latimargo*, *augustimargo*, Tutt, *fowleri*, South, *viridescens*, Tutt, *metallica*; female uppersides—*syngrapha*, H.-S.; *partim-transformis*. Male undersides—one with striated forewings, *minor*, Tutt; with striated forewings and *obsoleta* hindwings; *glomerata*, Tutt, *caeca*, *fowleri*, South, and many obsolete forms. Female undersides—one with forewings striated (extreme), one with forewings striated and hindwings obsolescent, one *tri-i-nigrum*, one with forewings *i-nigrum*, Tutt, and hindwings obsolete, and many *obsoleta* forms.

Heodes phlaeas. ♀ forewing upperside with all the black submarginal spots extended outwards into the dark brown border; underside with less extreme marking, and the hindwings are normal, Salisbury district, 1941. ♀ with all the orange colour below the median vein of forewing suffused with dark brown scaling, hindwing is normal, Stow, 1940. ♀ with submarginal spots on forewing indicated by mere dots, Chiltern Hills, 1941. ♂ ab. *radiata*, Petersfield, 1939; ♂ and ♀ upperside *obsoleta*, no trace of orange, Petersfield, 1941. *Lycaenopsis argiolus*, ♀ underside, forewing completely obsolete, hindwing almost obsolete, Salisbury, 1941.



last. The darker streaky marking shows itself more or less distinctly on this light ground and is sometimes narrower, sometimes wider. I am indebted to Herr A. Herrmann in Neuhoof Bez. Breslau, who captured it in his neighbourhood at light."

Alis anticis albidis, fasciis fuscantibus nubeculosis.

ab. *catenata*, Dnhl., *Ent. Zeits.*, XXXIX, 188 (1926).

ORIG. DESCIP.—"A very striking specimen with blackish powdering comparable with the *helvola-catenata* of Esper. The inner half of the submarginal line becomes a wide band formed with the narrow black transverse spots."

Xanthia, Ochs. & Tr. (1816-25), Dup., H.-S., Barr., Stdgr., (Sth.), Culot [*Cosmia*, Ochs & Tr. (1816-25), Hamp., Splr., Warr.-Stz., Drdt.: *Orthosia*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Ochria*, Hb. (1821), Tutt: *Mellinia*, Hb. (1821), South] *gilvago*, (Schiff. (1775)), Esp. (1789-?).

Schiff. was the first to use the word *gilvago* as a name for an insect of which he gave no definite description. The name *gilvago* was applied loosely to various species by different authors at that period so that it seems almost impossible to follow. Esper is the priority author who first described it.

Tutt, *Brit. Noct.*, III, 14 (1892): Meyr., *Handb.*, 62 (1895): Barr., *Lep. Br. Is.*, V, 375, plt. 231, 2 (1899): Stdgr., *Cat.*, IIIed., 208 (1901): Hamp., *Lep. Phal.*, V, 503 (1906): Splr., *Schm. Eur.*, I, 253, plt. 46, 24 (1907): South, *M.B.Is.*, II, 31, plt. 10, 9-10 (1908): Warr.-Stz., *Pal. Noct.*, III, 154, plt. 28, g, h (1910): Culot, *N. et G.*, I (2), 86, plt. 55, f. 9-13 (1914): Meyr., *Rev. Hand.*, 122 (1928): Draudt-Stz., *Pal. Noct. Supp.*, III, 153, plt. 19 d (1934).

Esp., *Abbild.*, IV, *Noct.*, II (1), p. 672, plt. 176, f. 2 (1789-?), gave a figure in which the marking was much too regular in arrangement.

Ernst & Engram., *Pap. d'Eur.*, VII, 166, f. 523 e (1792), gave a figure, which Werne. ascribed to this species. The authors called it a form of *fulvago*; Gn. called it *ocellaris*, which it cannot be.

Hb., *Samml. Noct.*, 192 (1800-3), under the name *palleago* gave a very good figure of a *gilvago* form. *l.c.*, 443 (1808), was a good dark figure.

Dup., *Hist. Nat.*, VII (1), 465, plt. 129, 4-6 (1827), stressed the fact that there are two chief forms of this species, of which he gave three excellent figures, 4 a sparsely marked ♂, 5 a heavily marked ♀, and 6 an ab. in which the yellow ground colour is hidden by a leaden suffusion leaving the transverse lines light in colour. He treated *palleago* as a good species and gave a good figure, plt. 130, 1. This in his *Cat.* (1844) he treated as a var.

H.-S., *Sys. Bearb. Noct.*, II, 217 (1849), included here the *ocellaris*, Bork., and considered that there were two species here. He included *palleago*, Hb., 192, "a pale example," and said that *gilvago* was often redder, and the white centre of the reniform more prominent. The

figure Hb. 442 "is a strong yellow." Hb. 443 is typical and may be redder and stronger spotted.

Gn., *Hist. Nat. Noct.*, V (1), 395 (1852), dealt with *palleago*, Hb. 442, as var. A of this species. He remarks on the numerous modifications, but none constant.

Hamp., *Lep. Phal.*, VI, 503 (1906), dealt with *gilvago*, which he attributed to Schiff. He cited Esp., plt. 176, 2 (1791): Hüb. 443, etc., and described two abs., subsequently named *gilvagella*, Strnd. (1915) and *derasa*, Warr.-Stz. (1910). He considered *palleago* as a good species, l.c., 504, and put *austanti*, Obtr., as an ab.; he cited Hb. 192 and 442 to this insect. He also recognized *ocellaris* as a species and cited Hb. 193 (*gilvago*) as representing the species.

Splr., *Schm. Eur.*, I, 253, plt. 46, f. 24 (1907), gave a very poor figure of this species. He described two forms ab. *griseosignata*, the pale bluish-grey marked, and ab. *cinnamomeago*, and recognized the ab. *palleago*, Hb., Italy.

South, *M.B.I.*, II, 21, plt. 10, 9-10 (1908), gave two good figures of this darker form.

Warr.-Stz., *Pal. Noct.*, III, 154, plt. 28, g, h (1910), gave six very good figures: ♂ and ♀ *gilvago*, ab. *suffusa*, ♂ and ♀ ab. *griseosignata*, Splr., and ab. *cinnamomeago*, Splr., and described ab. *derasa*, an extremely pale ochreous form, from Kashmir. He treated *palleago*, Hb., as a good species with *austanti*, Obthr., as a paler form of it.

Culot, *N. et G.*, I (2), 86, plt. 55, f. 9-13 (1914), gave five figures all very good. 10 was from the specimen in Guenée's collection, which he considered the type *gilvago*, Esp., with ground of fore-wings yellow-ochre and markings well expressed in brown-grey. 9 is an English example comparable to Hüb.'s fig. 443, a much darker form generally. 11 has a uniform ferruginous ground with normal marking, but not so marked as f. 9. 12, from the Gn. collection, is the *palleago*, Hb. (f. 442), and 13 is also a *palleago* with the subterminal dots obsolescent.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 153, plt. 19 d (1934), revised the matter of the main volume and gave details of 13 forms with figures of 4, *griseosignata*, Splr., *cinnamomeago*, Splr., *algorica*, B.-H., and *austanti*, Obthr. They stated that the *erythrago*, Warr., is *palleago*, Hb., and *pseudolineago*, Schwing., is the *rubra*, B.-H.

Barrett remarked on the Variation:—

Variable in the degree of mottling and banding of the forewings with smoky-purple or purple-brown, this, in some individuals, forming broad clouded transverse stripes, in others being much decreased in amount, broken into clouds and patches, or to a great extent obliterated. A very uniform pale brown form, much like pale *Orthosia ferruginea*, found in Germany does not seem to have been observed with us. A far more beautiful variety, bright orange-yellow with the markings reduced and broken up into spots and shades of rich purple-red, has been recorded as *X. ocellaris*.

Influenced, doubtless, by the action of his patron, the eminent entomologist Oberthur, Culot treated *austanti*, Obthr., as a good species, and figured the type specimen (*Noct. et G.*, I (2), plt. 55, 14). He de-

scribed the ground colour of the forewings as of a "very pale nankin tint, with the markings, for the most part reddish, but very slightly expressed." Culot then described three forms of *austauti*, which subsequently had been obtained in Algeria, all of which he figured.

Culot considered that there were two forms *palleago*, Hb.: (1) ab. *palleago* of *gilvago*, (2) ab. *palleago* of *austauti*, represented by Hübner's figures 443 and 442 respectively.

The Names and Forms to be considered are:—

- [*gilvago*, Schiff., *Verz.*, 87, N.S. 10 (1775).]
gilvago, Esp. (1789-?), *Abbild.*, IV, 672, plt. 176, 2.
 ssp. *palleago*, Hb. (1808), *Noct.*, 442.
 f. *austauti*, Obthr. (1881), *Et.* VI, 8.
 ab. *suffusa*, Tutt (1892), *Brit. Noct.*, III, 14.
 ab. *griseosignata*, Splr. (1907), *Schm. Eur.*, I, 253.
 ab. *cinnamomeago*, Splr. (1907), *l.c.*
 ab. *derasa*, Warr. (1910), *Pal. Noct.*, III, 155.
 ab. *erythrargo*, Warr. (1910), *Pal. Noct.*, III, 155.
 r. *algorica*, B.-Hs. (1912), *Iris*, XXVI, 157.
 f. *rubra*, B.-Hs. (1912), *l.c.*
 f. *batnaensis*, (Obthr.) Culot (1914), *N. et G.*, 89, plt. 55, 16.
 f. *monilifera*, (Obthr.) Culot (1914), *l.c.*, plt. 55, 15.
 ab. *rosina*, (Obthr.) Culot (1914), *l.c.*, plt. 55, 17.
 ab. *gilvagella*, Strnd. (1915), *Arch. f. Naturg.*, LXXXI, A.12, p. 149.
 ab. *xantheago*, Schaw. (1921), *Ver. z.-b. Gesl. Wien*, LXXI, 157.
 ssp. *bathi*, Döring (1934), *Int. ent. Zts.*, XXVIII, 3.
 ab. *fuscescens*, Döring (1934), *l.c.*, XXVIII, 5.

Tutt dealt with (1) the typical form, with central area covered with dots; (2) f. *palleago*, a pale form with obsolescent marking; (3) ab. *suffusa*, much suffused with a deep fuscous central band on forewings.

Palleago, Hb., was considered a species at first, later it was treated as a pale form of *gilvago* and as such was treated by Tutt in *Brit. Noct. Hamps.*, in *Lep. Phal.*, treated it as a species again and placed the *austauti*, Obthr., as a still paler form, from Algeria, and he was followed by Warren in *Stz.*, *Pal. Noct.* However, in 1934, Dr Draudt in *Seitz, Pal. Noct. Supp.*, III, 153, went thoroughly into the relationship of *palleago* and determined it as a ssp. of *gilvago*.

Draudt says that "the *gilvago* type is pale yellowish-ochre with blackish or bluish-grey-brown marking of transverse lines." (Tutt does not actually describe the typical form). The forms noted are *griseosignata*, Splr. (the fig. in the main volume represents the *intermedia* form of *ocellaris*); *suffusa*, Tutt; *cinnamomeago*, Splr. (wrongly diagnosed in the main volume); *palleago*, Hb., was renamed *erythrargo* by Warren in the main volume and treated as a species, this treatment is reversed (the fig. in main volume is also wrong); *algorica*, A. B.-H. (= *batnaensis*, Obthr.); *rubra*, A. B.-H. (= *pseudolineago*, Schwing.); *austauti*, Obthr. (at times treated as a species, but is a paler form of the *palleago*; *gilvagella*, (Hamps.) Strand.; *xantheago*, Schaw.; *monilifera*, Culot; *rosina*, Culot; ssp. *bathi*, Drng.; and *fuscescens*, Drng. The form *derasa*, (Hamps.) Warren, is not repeated from the main volume.

f. *austauti*, Obthr., *Et. d'Ent.*, VI, 8 (1881).

FIG.—Culot, *N. et G.*, I (2), 89, plt. 55, 14 (fig. made from the type) (1914).

ORIG. DESCRIP.—“The ground colour of the forewings is of a very pale nankin colour, with the markings for the most part reddish, but almost obsolescent.” Oran prov., Algeria.

ab. *cinnamomeago*, Splr., *Schm. Eur.*, I, 253 (1907).

ORIG. DESCRIP.—“Occasionally the very variable forewing ground colour becomes grey-cinnamon-red, the indefinite dark marking purple-grey, the hindwing fringes reddish.”

ab. *griseosignata*, Splr., *Schm. Eur.*, I, 253 (1907).

ORIG. DESCRIP.—“Sometimes the marking outside the usual blackish dots on the waved line is clear bluish-grey.”

ab. *derasa*, Warr.-Stz., *Pal. Noct.*, III, 155 (1910) (Hamps., *Lep. Phal.*, VI, 504 (1906)).

ORIG. DESCRIP.—“A paler ochreous form of which the extreme development is wholly pale ochreous with only the lower half of the reniform and the fringe dark brown, exactly corresponding to the unmarked form *flavescens* of *fulvago*.”

Cf. ab. 2, Hampson, “Head, thorax and forewing ochreous-whitish, the last with all the markings almost obsolete, except the dark annulus at lower angle of cell and subterminal points; cilia rufous; hindwing whiter.

ab. *erythrago*, Warr.—Warren in Stz., *l.c.*, envisaged a second *palleago* as another species of the same name in the same genus so he replaced the name *palleago*, Hb., 442.

r. *algirica*, Bng.-H., *Iris*, XXVI, 157 (1912).

ORIG. DESCRIP.—“From Batna, Algeria, we have obtained a large number of examples, which diverge considerably from the European form; they are distinguished by more rust-reddish colour, by strong pale reddish reniform, as well as by grey hindwings, which have, close to the margin, a distinct, slightly darker band.”

f. *rubra*, B.-H., *Iris*, XXVI, 157 (1912).

ORIG. DESCRIP.—“At the same time as *gilvago*, ssp. *algirica*, as well as a larger number of *lineago* (from Batna) one only was taken, which agreed tolerably well in colour with those from mid-Europe, but nearly half of the specimens taken show a very definite, uniform, dull red colour which contrasts strongly with the dusty reddish-grey of the European form. The hindwings of *rubra* are also similar to those of subsp. *algirica*.”

f. *monilifera*, Culot, *N. et G.*, I (2), 89 (1914).

FIG.—*l.c.*, plt. 55, 15.

ORIG. DESCRIP.—“Ground colour of the forewings of a grey nankin, similar to that of the type *austauti*, with the space between the median shade and the elbowed line tinged with reddish; lines and markings well expressed in brown. Hindwings similarly tinged with brown, ex-

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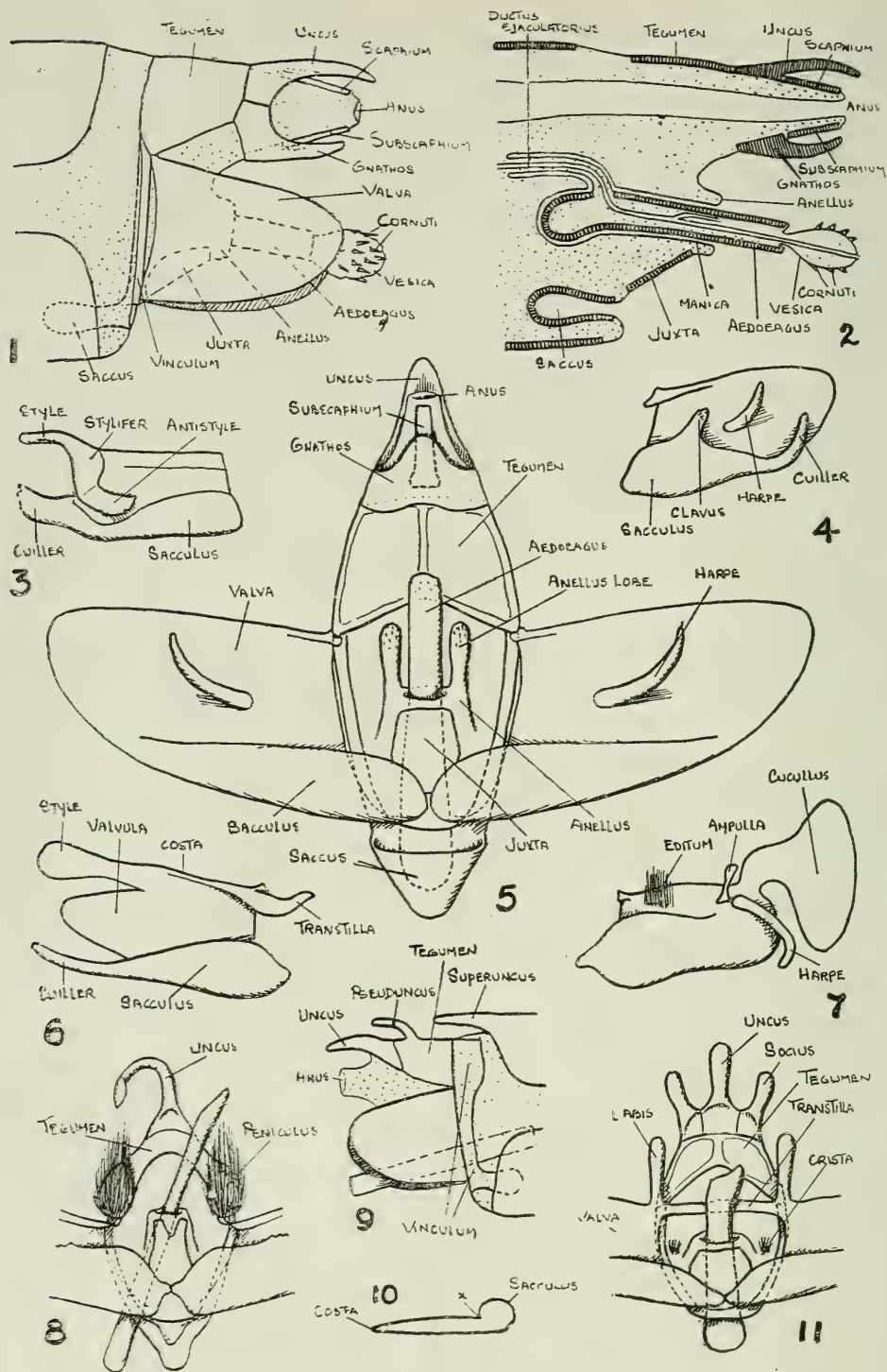
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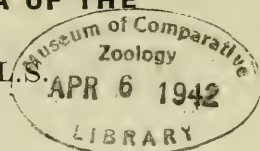
MALE GENITALIA OF LEPIDOPTERA.

THE MORPHOLOGY OF THE MALE GENITALIA OF THE LEPIDOPTERA.

By BRYAN P. BEIRNE, Ph.D., F.R.E.S., F.I.S.

(Plate I.)

13,820



A great many writers have studied the genitalia, particularly the male genitalia, of the Lepidoptera from a taxonomic viewpoint but the nomenclature and morphology of the different parts have been a matter of much confusion; in fact, an average of more than six different names have been applied to each separate organ in the male. This paper is an attempt to elucidate the homologies of the different parts of the genitalia and the name used here for a particular structure is the name which has been used for that structure by the majority of writers who have applied a name to it; for this some two hundred and sixty papers dealing with the Lepidopterous genitalia have been seen, including most of the papers in British periodicals and many Continental but few American works. In other words, the standard taken here for the nomenclature is that of usage; there are a few exceptions to this, however, where the common name for a structure is not in agreement with its morphology. This is the only practicable standard; one might take priority as a standard but many of the older writers were very vague in their definitions and had little regard for the morphology of the structures. Anyway, the law of priority does not apply to morphological nomenclature. The following conclusions were arrived at from a study of the genitalia of over seven hundred species, belonging to various groups, as well as from a study of the literature.

THE TENTH AND FOLLOWING SEGMENTS:—Before discussing the morphology of the different parts it is necessary to describe the structures of the tenth and following segments. The *anus* opens at the apex of the abdomen at the end of a membranous tube, the *anal tube*, which is occasionally sclerotized dorsally, this sclerotization being in the form of a long, narrow plate, known as the *scaphium* (Figs. 1 and 2), the basal end of which is articulated with the ventral side of the *uncus* while the anus opens beneath its apical end (examples: *Gluphisia crenata*, *Catocala nupta*). Sometimes the anal tube is sclerotized ventrally in a similar manner and this ventral sclerotization is known as the *subscaphium* (Figs. 1, 2, and 5) and articulates at its basal (or anterior) end with the inside of the *gnathos*, if this structure is present (examples: *Odontosia carmelita*, *Melanchra persicariae*). The *uncus* is a very prominent feature of the genitalia and is rarely absent. It is typically in the form of a large, strongly sclerotized, tapering arm arising from a broader base the anterior edge of which is attached to the caudal margin of the tegumen, while the anterior end of the dorsal part of the anal tube and of the scaphium, if this structure is present, is attached to the posterior and lateral edges of this base. While the *uncus* is usually simple in form, it is frequently bilobed or bifurcate (as in *Lycaenidae*, *Melitaea*), but apparently rarely trifurcate, the so-called trifurcate *uncus* being usually either a simple *uncus* and a pair of *socii* or a simple *uncus* and a pair of *gnathos* arms. The *gnathos* (Figs. 1, 2 and 5) is a structure similar to the *uncus* but on the ventral side of the anal tube and is present in a very large num-

ber of Lepidoptera. It is typically in the form of a pair of arms, which are attached at their bases to the lateral edges of the base of the uncus, and to the caudal margin of the tegumen, and which extend around the anal tube to meet in the mid-ventral line, where they are often expanded as a plate (the *ventral plate*), produced posteriorly as one or two spines or arms, or otherwise modified and ornamented. In a few groups (e.g. *Satyridae* and *Lycaenidae*) the lateral arms are free and do not meet in the mid-ventral line. The anterior end of the ventral part of the anal tube, and of the subscaphium if this structure is present, is attached to the inner wall of the gnathos, and when both uncus and gnathos are present and fully developed they form a complete ring separating the anal tube from the ninth segment. The *socii* (Fig. 11) are a pair of structures attached at their bases to the lateral edges of the base of the uncus and usually also to the caudal margin of the tegumen; when a gnathos is present in addition to the *socii* they are situated between the base of the uncus and the bases of the lateral arms of the gnathos (as in *Drepanidae*). In the more primitive Lepidoptera (e.g. *Eucosmidae*) the *socii* are simple, hairy pads or lobes, but in the higher forms (e.g. *Notodontidae* and *Cymatophoridae*) they may become strongly sclerotized and exhibit various modifications in shape. Like the uncus, they are always more or less adorned with hair, and this character serves to distinguish them from gnathos arms in species in which the two sides of that structure do not meet in the mid-ventral line.

Now with regard to the morphology of the above structures, Zander (*Z. wiss. Zool.* (1903): 557) and Mehta (*Quart. J. micr. Sci.* 1933: 35) state that ontogenetically the uncus arises as an outgrowth from the base of the scaphium and becomes secondarily attached to the caudal margin of the tegumen, while the gnathos arises in a similar way from the subscaphium. However, from a study of the genitalic musculature Forbes (*Ann. ent. Soc. Amer.* 1939: 1) showed that the uncus—its base rather than the distal portion—is the tenth tergum, while the gnathos—the ventral plate rather than the lateral arms—is the tenth sternum, while the anal tube represents either the eleventh or twelfth segment, one of these segments having been lost; the scaphium is then the tergum and the subscaphium the sternum. That this interpretation of the parts is probably correct is shown by the fact that the anal tube is separated from the ninth segment by the basal parts of the uncus and gnathos and that when the scaphium is present its base articulates with the base of the uncus and is not fused to, and forming part of, it is as likely to be the case if the uncus was merely an outgrowth from the scaphium; similarly with the subscaphium and the gnathos. As in no species I have seen is there any trace of extra sclerites between the uncus and scaphium and between the gnathos and subscaphium, it seems likely that the anal tube is the eleventh, rather than the twelfth, segment; the scaphium is, therefore, the eleventh tergum and the subscaphium the eleventh sternum. Furthermore, with regard to the morphology of the uncus, some groups have developed structures morphologically similar to the distal part of the uncus on the ninth and eighth terga, the pseuduncus and superuncus respectively. Presumably, then, what Zander and Mehta regarded as the tenth tergum was really the tenth and eleventh. The *socii* are probably homologous with the anal prolegs of the larva and,

as Forbes pointed out, may belong to the eleventh segment, rather than to the tenth.

THE NINTH SEGMENT:—This is the main genital segment, bearing the phallic and clasp ing organs, and is always highly modified. The ninth tergum or *tegumen* is usually well developed; it is in the form of a plate, usually tapering caudally and more or less emarginate in the middle of its anterior edge, over the genitalia, and in some groups (e.g. *Notodontidae*) is completely divided up the mid-line. The uncus, gnathos and socii are attached to its caudal edge, its anterior lateral corners usually articulate with the upper basal corners of the valvae, while the upper ends of the vinculum are attached to its anterior edge near the lateral corners. In Rhopalocera, where the vinculum forms a complete ring around the abdomen, the tegumen is often much reduced and even absent in some groups, its place being taken by a dorsal expansion of the vinculum. A very characteristic ornamentation of the tegumen is for it to be thickened around its edges and up the mid-line (Figs. 5 and 11). The *pseuduncus* (Fig. 9) is a median, posteriorly-directed projection from the tegumen near its caudal edge (as in *Colias*). The *peniculi* (Fig. 8) are rounded expansions of the tegumen, closely covered with hair, near its lateral edges (in many *Agrotidae*). The *pedunculi* are the extensions of the lower lateral corners of the tegumen which meet the upper basal corners of the valvae. The *lateral lobes* are expansions from the lateral edges of the tegumen or of the pedunculi. The ninth sternum or *juxta* is a small, variously-shaped plate situated on the ventral wall of the anellus to which are attached the bases of the sacculi (i.e. the lower basal corners) of the valvae. In some of the lower Lepidoptera the valvae are wholly attached to the juxta.

The *vinculum* is a large sclerite situated between the sclerites of the eighth and the sclerites of the ninth segment. It is typically in the form of a flattened U, the bottom of the U being situated on the ventral side of the abdomen, while the upper ends are attached to the anterior margin just dorsal to the lateral corners; in Rhopalocera, however, it forms a complete ring around the abdomen, the dorsal part of this ring being attached to the tegumen and frequently expanded so much that the tegumen is very much reduced or even lost. Ventrally the vinculum is expanded and produced anteriorly as a usually broad and tapering plate which, because of its size and the position of the vinculum, extends anteriorly above the eighth sternum. As a result of this the intersegmental membrane, which extends from the anterior edge of the vinculum to the posterior edge of the eighth sternum, is folded inwards above the eighth sternum, so that a sac-like pocket is formed, the upper wall of which is formed of the expanded basal part of the vinculum and the lower and lateral walls of the intersegmental membrane, which is usually sclerotized to a degree equal to that of the vinculum; this pocket is the *saccus*. The lateral arms, and in Rhopalocera the dorsal part, are often also withdrawn in the body wall so that a groove is formed around the body, the inner wall of this groove being formed of the vinculum proper and the outer wall of the intersegmental membrane, which is often sclerotized to a degree equal to that of the vinculum. As will be shown later, the vinculum itself is merely a sclerotization of the intersegmental membrane between the eighth and ninth segments so that actually the outer wall of this groove and the

lower and lateral walls of the saccus are really parts of the vinculum.

There is no doubt that the tegumen is the ninth tergum—it occupies the correct position and there is no other structure which could be this tergum—but that the juxta, and not the vinculum, is the ninth sternum is shown by several facts. In the majority of Lepidoptera the lower basal corners (i.e. the bases of the sacculi) of the valvae are attached to the juxta; in other words, the juxta occupies the same position in relation to the valvae as does the tegumen, only on the ventral side, and the vinculum is situated anterior to both. In some of the lower Lepidoptera (e.g. *Hepialidae*) the valvae are wholly attached to the juxta. In the Rhopalocera the vinculum forms a complete ring around the abdomen; this would be highly improbable morphologically if it were the ninth sternum. Furthermore, the edges of the vinculum are often indeterminate and, particularly in the region of the saccus, it is often difficult to say where the vinculum ends and the membrane begins. The ventral part of the vinculum and the lateral arms are continuous, there is no trace of a suture between them, and therefore makes it highly improbable that these parts are distinct structures. A very similar and analogous structure to the vinculum is found in Hymenoptera, the basal ring or lamina annularis of Snodgrass (*Smithson. misc. Coll.* 99), which also in some groups is U-shaped while in others it forms a complete ring around the abdomen. All the evidence points to the vinculum being a sclerotization of the intersegmental membrane between the sclerites of the eighth and the sclerites of the ninth segment; it was apparently developed primarily to form a base for the whole genitalia, as it is well developed in those primitive forms in which the valvae are completely dissociated from it, but in higher forms its main function is to provide a support on which the valvae rest. According to Mehta the valvae are developed quite independently of the vinculum, but by evagination of the pouch in which they are formed they come to lie along its edge; the studies of Chapman (*Proc. S. Lond. ent. nat. hist. Soc.* 1910: 85; *Ent. Rec.* 1912: 169; *Trans. ent. Soc. Lond.* 1912: 407) confirm this. Moreover, the valvae are apparently never fused to, and forming part of, the vinculum but rest on, or rather within, it.

The valvae are the chief clasping organs of the male and are of the greatest importance taxonomically. They are typically in the form of a pair of large, flattened, double-walled lobes, usually more or less tapering and bluntly pointed apically and always adorned with hair and scales. In the more primitive forms their bases articulate with the juxta, but in the higher forms they come to rest on the lateral arms of the vinculum, but their lower basal corners remain articulating with the juxta and the upper basal corners usually with the anterior lateral corners of the tegumen. The area along the lower margin of each valva is differentiated into an expansion or sac-like position, the *sacculus*. The sacculus appears to be formed of part of the outer wall of the valva which has been extended and folded over inwards so as to form part of the inner surface, the inner wall not being continued to the lower edge of the valva, but meeting the edge of the folded-over part of the outer wall; the junction between the inner and outer walls proper of the valva (X in Fig. 10) is therefore situated on the inner surface. The part of the outer wall which is situated on the inner

surface of the sacculus is widest at its base, where it is attached to the juxta and usually also to the sacculus from the opposite side, but towards its apex it becomes narrower and often finally indistinguishable from the remainder of the valva, but is frequently extended as a strongly sclerotized and usually curving arm, the *cuiller* (Figs. 3, 4 and 6) free from the remainder of the valva and either lying on its inner surface or extended beyond its apical or lower margins. Sometimes there is a frequently dentate projection, or arm, from the upper margin of the sacculus, usually near its base but not from its apex, lying on the inner surface of the valva; this is the *clavus* (Fig. 4). The upper margin of the valva is known as the *costa*; this name is also applied to the area immediately below this margin when it is more or less strongly sclerotized or otherwise differentiated from the remainder of the valva. Often the costa is produced at its apex as a free arm, the *style* (Figs. 3 and 6). The area of the valva between the costa and the sacculus, when these areas are differentially sclerotized or separated from each other by incisions from the apex of the valva (as in *Ortholitha mucronata*), is known as the *valvula* (Fig. 6). In many *Agrotidae* (*Noctuidae*) and *Tortricidae* (as in *Leucania littoralis*; *Eucosma cana*) the valva is constricted near or beyond its middle, the constriction being followed by a broad apical expansion, known as the *cucullus* (Fig. 7). The basal angle of the costa, besides articulating with the lower lateral corner of the tegumen, may be produced inwards as a bar or strut, above the anellus, which may meet and fuse with its fellow from the opposite side; this bar is the *transtilla** (Figs. 6 and 11). The *transtilla*e may bear a pair of usually knobbed and hairy arms, sometimes fused at their apices, each arising from the point of union between the costa and the *transtilla*; these arms are the *lubides* (Fig. 11); as in *Arctia caja*. The *harpe* (Figs. 4, 5 and 7) is a strongly sclerotized arm, usually in the form of a curving spine, provided with independent musculature and arising from the inner surface of the valva usually near the base, or middle and usually above, and always quite distinct from, the sacculus and extending outwards and upwards as a free arm. It might be mentioned here that most American writers refer to the valva as the *harpe* and the *harpe* as the clasper. The *anal angle* is the lower apical (or tornal) angle of the valva and the *anal spine* is a spine projecting from the anal angle. The *margin* is the apical margin of the valva and the *marginal spines* are outwardly-directed spines along the margin, while the *corona* is a row of inwardly-directed spines parallel to, and near, the margin and situated on the inner surface of the valva. The *digitus* is a short projection arising from the inner surface of the valva near the apex. The *pollex* is a usually digitate projection from the anal angle, and the *ampulla* is a small, knobbed arm arising from the valva at the base of the *harpe* (in many *Agrotidae*). The *stylifer* is the base of the style when it appears separated from the remainder of the valva and the *antistyle* is a short, inwardly-directed arm arising from the base of the style and lying on the inner surface of the valva (both in certain *Hesperiidae* (Fig. 3)). The *costal arm* is any arm aris-

*The term *transtilla* has previously been applied to the cross-bar formed by the union of the two arms. As it is often desirable to refer to one of the bars, when they are not fused, it is best to call each a *transtilla*, the two being the *transtilla*e.

ing from the costa between its base and its apex and the *costal fold* is the margin between the costa and the valvula. The *crista obliqua* is a strongly sclerotized and toothed bar on the inner surface of the valva (in *Argynnis*). The *furca* is the sacculi which have become mainly, or wholly, separated from the remainder of the valva and fused to each other in the mid-line; to be more exact it is the fused cuillers (as in *Ennomos autumnaria*). The *footstalk* is the stalk of the labis. The *editum* (Fig. 7) is a patch of long hairs on the inner surface of the valva near the base.

(To be concluded.)

PUPAL MANDIBLES IN THE CURCULIONIDAE.

By H. DONISTHORPE, F.R.E.S., F.Z.S., etc.

Recently Mr S. O. Taylor of Leicester sent me a specimen of *Phyllobius virideaeris*, Laich., which had retained the deciduous, false, or pupal mandibles. The specimen in question was immature and without its proper colouring. It was taken at Barkby Holt, Leicestershire, by Mr D. Tozer on 15th June 1941.

As long ago as 1896 I dug-up, at the roots of a tree in a field at Oakham, an example of *Otiorrhynchus sulcatus*, F., which possessed the pupal mandibles, and was decidedly immature. This specimen is now in the National Collection. Although a considerable number of such cases have been met with throughout the world, and a certain amount has been written on the subject, nothing is really known as to the origin of these structures. It has been stated that their purpose is to assist the newly-hatched beetle to emerge from the ground; but this, I understand, is by no means certain. Appended will be found some extracts from the literature on the subject, as also a list of the British specimens in the National Collection.

In 1864 Aubé, in a paper on the synonymy of certain weevils, writes: —“ Enfin M. Chevrolat, en décrivant le *mandibularis* [*Omius*], s'est laissé abuser par la présence de l'appendice mandibulaire qu'on ne rencontre que sur des sujets très nouvellement éclos de certains Charançons, appendice qui est caduque et n'est propre, je crois, qu'à quelques espèces qui subissent leur dernière métamorphose dans la terre et doit leur servir, à défaut de longues mandibules ou de pattes fouisseuses, à faciliter leur sortie du sol. J'ai pu observer cet organe supplémentaire sur les curculionides suivants qui ont été pris au premier printemps et que je mets sous les yeux de la Société, ce sont: *Otiorrhynchus raucus*, *Peritelus griseus*, *Cneorhinus geminatus*, *Metallites ambiguus*, et *Phyllobius calcaratus*.”

Bedel, in 1883, writes in the “ Coleoptera of the Basin of the Seine ”: —“ 2e Sous-Famille *Brachyrrhinidae* (*Otiorrhynchidae* et *Brachyderidae* auct.). Mandibles portant, à leur angle antéro-externe, un appendice corné ou la cicatrice de cet appendice. Métamorphoses entièrement souterraines. L'appendice mandibulaire, signalé plus haut, est un organe transitoire propre aux *Brachyrrhinides*; on l'entrevoit chez la nymphe (1), mais il n'appareût distinctement qu'à l'était parfait, au moment de l'éclosion. Ce sont deux tiges cornées, brillantes, souvent falciformes, ajustées au devant des mandibules qu'elles arrivent à

masquer en partie. Ces fausses mandibules sont habituellement caduques; (2), elles laissent, en se détachant, une cicatrice dépolie comme la cassure d'une fayence écornée. En ayant soin d'examiner les mandibules de face avec un peu d'habitude, on distingue facilement cette cicatrice caractéristique."

(1) Lacordaire signale le fait et cite comme exemple les nymphes de *Brachyderes*; leur mandibules sont allongées 'au point d'avoir environ le tiers de la longueur du corps (Gen. des. Col., VI, p. 5, note).' (2) La chute des pièces mandibulaires se produit ordinairement à la sortie du sol; aussi ne les voit-on guère que chez des sujets fraîchement éclos; il est beaucoup plus rare de les retrouver chez des individus bien adultes. Dans quelques genres, comme les *Psolidium* Ill., elles résistent davantage et se conservent plus souvent, mais leur présence n'est pas constante, comme le prétend Lacordaire (loc. cit., p. 5, note)."

Fowler, in 1891, wrote as follows:—

“ Subfamily BRACHYRRHININAE.

(*Otiorrhynchidae* and *Brachyderidae*.)

They comprise all those genera in which the mandibles are provided externally at apex with a corneous appendage, or with the cicatrix of such appendage; these appendages are always present in the pupa state, but are deciduous and are almost always shed as soon as the perfect state is attained; they may, however, be occasionally observed, and I have in my collection a fully developed specimen of the rare *Coenopsis fissirostris* in which they are very perfect and are about as long as the rostrum; in one or two specimens also of *Otiorrhynchus tenebricosus* in my possession one appendage remains, but in this species these false mandibles appear to be much shorter proportionately and less falcate than in *Coenopsis*; Leconte and Horn ("Classification of the Coleoptera of North America, p. 434") notice this variation and state that the deciduous pieces are of varying form, usually elongate and slender, sometimes falcate and acute, or short and conical; as they were the authors who called more particular attention to the importance of the character presented by these false mandibles (although it had, of course, been noticed long before by various writers) their remarks on the subject may with advantage be quoted:—

'In the early life of the imago these pieces are lost and the place of their attachment is indicated by a scar, which is usually on the face of the mandible, but frequently borne at the tip of a process of varying length. The form of the mandible itself, without reference to the scar, indicates the occurrence of the deciduous piece. When the mandibles are acute at tip and one overlaps the other by an edge more or less acute, no deciduous piece will be found. Its occurrence may generally be expected in those in which the mandibles meet with a broad surface and whose function is rather that of crushing than cutting.' "

Of the larvae he says: " . . . the use of the false mandibles is obviously to allow them to work their way through their surroundings on their emergence from the pupa state: when once they have emerged they shed them as they have no further use for them, their habits being, as stated above, to crush rather than cut the leaves, etc., that form their food."

(To be continued.)

SOME NOTES FROM THE CLEVEDON DISTRICT IN 1941.

By J. F. BIRD.

Under more propitious conditions, 1941, would, probably, have proved a most productive year, but owing to the war, with its restrictions and duties, any serious collecting was hardly possible. The following notes, therefore, are limited to observations and captures made, either in my garden, or else within a few miles of my house, when I was able to spend a little time in the pursuit of Lepidoptera.

With the exception of the phenomenal swarms of *Pieris brassicae* during 1940, I have been rather surprised at the comparative paucity of butterflies in this part of Somerset. But during last season the *Rhopalocera* were much more plentiful; some species, indeed, being unusually abundant. *Argynnis paphia*, for instance, not as a rule common, was very much in evidence flying along the borders of the woods and down the sunnier sylvan tracks. Curiously enough, all appeared to be males; in fact I was unfortunate in not observing a single female, although I was on the lookout for some for replacements in my collection. Their whereabouts, to me, was a complete mystery. It recalled to my memory two similar instances of local disparity in the numbers of the sexes in West Somerset. Some twenty years previously, I had noticed then that the males of *A. cydippe* were far more numerous in the country around Minehead than the females, yet during an outing on the Quantocks, fifteen miles away near Cothelstone, I found the females in abundance, whilst it was the males that were few and far between.

On 30th August, when out with my youngest son, he noticed, and netted, a most remarkable bleached *Maniola jurtina* flying about and settling on a patch of wild flowers. The forewings of this teratological specimen are almost entirely white, but the pupilated spot is present, besides a slight brownish shading around the discal cell and along four-fifths of the costal margin from the base of the wing. The hindwings are of a normal fuscous-brown hue. Unfortunately, the right forewing is rather badly malformed. With one exception, all the bleached examples I have come across have been males. Is there any particular reason, pathological or otherwise, which might explain why one of the sexes should, seemingly, be more affected than the other? It would be interesting to know if it is the usual experience of other collectors.

As the season was late in starting, owing to a cold spell during the Spring, perhaps the following dates of the first, and in some cases the last, appearances of the butterflies observed during the year in this district may be of interest, especially as I have included, for comparison, dates recorded by myself in the county during former years which I have placed in brackets.

Pieris brassicae.—1st brood, (22.4.19) 12th June; 2nd brood, (9.7.19) 20th July.

P. rapae.—1st brood, (23.3.18), 16th April; 2nd brood, (3.7.39-17.9.13) 1st July-20th October.

P. napi.—1st brood, (9.4.18) 12th May; 2nd brood, (28.6.21) 1st August, but probably seen earlier.

Anthocharis cardamines.—(19.4.14-26.6.14) 3rd May.

Colias croceus.—(28.7.22-8.10.21) 30th August-13th September. Occurred sparingly at Clevedon and Tickenham.

Gonepteryx rhamni.—Hybernated, (11.3.40) 15th March-2nd July; fresh brood, (31.7.40) 19th August-3rd October. I have rarely, if ever, seen the new brood so numerous. On 30th August, at Tickenham, my son and I came across the uncommon spectacle of a large gathering of this species dangling conspicuously on the flowering plants growing in a small sheltered spot, almost surrounded by woodlands, during a temporary obscuration of the sun; and it was a fascinating sight when these gaily-hued butterflies "took off" to flutter lazily around together with many other Diurni, including several *Polygonia c-album*, when the clouds had passed.

Polygonia c-album.—Hybernated, (9.4.39) 11th May; 1st brood, (4.8.17) 14th July-30th August; 2nd brood, (17.9.39-19.10.39) 17th September-8th October. The summer brood was more plentiful than usual.

Aglais urticae.—Hybernated, (11.2.39) 16th April; 1st brood, (15.6.17) 22nd July; 2nd brood, (21.8.17, bred) 13th September-6th October.

Nymphalis io.—Hybernated, (8.2.13) 16th April; fresh brood, (11.7.21) 19th August-7th October.

Vanessa cardui.—Immigrant; (22.5.17) 29th June; fresh brood, (23.7.21-23.9.40) 19th August-12th October.

V. atalanta.—Immigrant, or hybernated, (28.4.16-26.6.39) 25th June; fresh brood, (14.7.40-21.11.15) 18th July-11th November.

Argynnis paphia.—(7.7.17) 2nd July.

A. cydippe.—(16.6.17) 2nd July.

A. aglaja.—(7.6.21) 22nd July.

Brenthis euphrosyne.—(5.5.17) 18th June.

B. selene.—(16.5.14-10.7.22) I am not certain that I saw any last year, but like *euphrosyne* this species does not appear to be common around here.

Eumenis semele.—(28.6.21) 22nd July. Unexpectedly scarce; I have only observed two in this district—one at Tickenham and the other on Walton Common.

Pararge aegeria.—1st brood, (18.4.39) 9th May; 2nd brood, (22.5.16-22.7.22) 12th June; 3rd brood, (22.7.19-5.9.16) 19th August-5th October. Plentiful; with the exception of the two "garden whites," was the most constant butterfly in my garden throughout the season.

P. megera.—1st brood, (25.4.14) 12th June; 2nd brood, (16.7.21) 19th August.

Maniola jurtina.—(1.6.14) 18th June-17th October.

M. tithonus.—(4.7.14 and 21) 22nd July. Abundant; a few seen with extra spots.

Aphantopus hyperantus.—(21.6.40) 2nd July. Locally common.

Coenonympha pamphilus.—(2.5.14) 12th June-7th October.

Thecla w-album.—(7.6.40, bred) 22nd July, when several were observed darting about the topmost branches of a wych-elm in a wood. It appears to be very local and scarce.

Lycaena phlaeas.—1st brood, (3.5.15) 12th June; 2nd brood, (17.7.17) 22nd July-6th October.

Aricia agestis.—1st brood, (18.5.40) 18th June; 2nd brood, (21.7.17) 30th August.

Polyommatus icarus.—1st brood, (11.5.40) 12th June; 2nd brood, (21.7.17) 22nd July.

Lycaenopsis argiolus.—1st brood, (30.3.14) 26th May; 2nd brood, (3.7.22) none seen. Apparently not common during 1941.

Cupido minimus.—(20.5.40) 19th June-2nd July. Extremely local and not very numerous, so I was surprised when my wife drew my attention to one at rest on a plant in the garden on 5th May 1940.

Pyrgus malvae.—(27.4.40) 9th May.

Erynnis tages.—(16.5.21) 18th June.

Adopoea thaumas.—(24.6.17) 22nd July. Only one seen at Tickenham. I have been informed that it is now extremely scarce in North Somerset.

Augiades sylvanus.—(30.5.19 and 21) 18th June.

The only Sphingids noted during the year were *Sphinx ligustri* and *Deilephila porcellus*, the latter frequently observed at dusk in the garden during June and the beginning of July, attracted by *Centranthus ruber*; and a full-grown larva was casually found by my son whilst walking past a clump of *Galium* on 30th August. Besides these, on 9th July, I at first heard, then observed for quite a while, two largish "hawks," which may only have been *D. elpenor*, hovering in company whilst extracting the nectar from the valerian growing on the top of a stone-wall in my garden, but out of reach of my net.

Do the larvae of *Drymonia ruficornis* feed on the evergreen leaves of the holm-oak? On 31st July, my wife came across a full-fed larva crawling along a road on the outskirts of Clevedon which I thought looked like this species, and not *D. trimacula*, but was not sure for it had altered colour preparatory to spinning up, as it did next day, 1st August. I hope, however, it will establish its identity by emerging in the spring. By the spot where the larva was found is a large garden containing several fair-sized holm-oaks that overhang the roadway; whilst the nearest *Quercus robur* is quite a quarter of a mile, or more, away in a copse. I have looked through several entomological text-books, including Seymour St John's, *Larva Collecting and Breeding*, but failed to find *Quercus ilex* mentioned as a pabulum for either *D. ruficornis* or *D. trimacula*.

Parasemia plantaginis is locally common, and the small hibernated larvae are to be found, sometimes plentifully, during the last week of March and the commencement of April, on fine days as they bask in the sunshine on the short mossy turf in their particular haunts. Since coming to Clevedon I have reared a number, not many, however, varying greatly from the type, but on 2nd July, my youngest son netted a male with the ground colour of the forewings pure white, instead of cream. This encourages us to hope that, one of these days, we may obtain ab. *hospita* in Somerset!

In the garden the valerian (*C. ruber*) was productive, and among the visitors to the alluring blossoms, *Plusia gamma*, as usual, was a nuisance although late in appearing. The first recorded was on 17th June, compared with 31st May in 1940, while my earliest record for the county was 16th May 1914. Besides this pest, however, several interesting insects were also attracted, including: *Agrotis corticea*, a short but varied series, of males only, ranging from typical to plainly-marked suffused examples with smoky-grey hindwings; *Peridroma saucia* ♀, on 24th June; *Apamea sublustris*, and a perfect specimen of *Heliothis peltigera*, netted by my son at early dusk on 24th June.

From a patch of bladder campion (*Silene inflata*), which I have allowed to grow in an odd corner, we have taken: *Deilephila porcellus*, the variable *Hadena lepida*, *H. bicruris*, *H. cucubali*, and *Eupithecia venosata*, the last in abundance.

The garden also produced, amongst other things: *Arctia villica*, bred from a solitary larva found crawling along a path in the spring; *Spilosoma lutea* ♀, ab. *fasciata*; *Malacosoma neustria*, a few plain reddish-brown specimens bred from larvae off a double cherry tree; *Amathes triangulum* ♀, bred from a larva off primrose; *Antitype flavicincta*, the largest ♀ I have seen, bred from a larva reared on marigold blossoms upon which it was feeding when found; *Cosmia pyralina* ♂, already recorded as new to the county (*Ent. Rec.*, liii, p. 109); *Cucullia verbasci*, the larvae a veritable nuisance on garden mulleins, and less commonly on Buddleia; *Cleora repandata* ♂, a melanic specimen, perhaps referable to ab. *nigricata*, the second example taken in the garden; *Acasis viretata*; *Eupithecia pulchellata*, including the larvae in the blossoms of foxglove; *E. linariata*, and *Botys ferrugalis*.

I conclude with a few of the other Lepidoptera recorded in the neighbourhood during the season: *Dasychira pudibunda*, *Lasiocampa quercus*; batches of the ova of *Macrothylacia rubi*, laid on the ends of stalks of various low plants; larvae of *Drepana falcata*, *Notodonta dromedarius*, *Achlya flavicornis*, and *Polyplocia ridens*; *Lygephila pastinum*, "walked up" on rough common land; *Biston strataria* ♀, on 22nd March, at rest on an oak trunk about 1 foot from the ground; *Ectropis bistortata* and *E. punctularia*, also on tree trunks; *Erannis aurantiaria*, a few bred during December, including an exceptionally well-marked male; *Perizoma albulata*, to be obtained in plenty, about the middle of June, by beating the bushes in the vicinity of its food plant, yellow rattle (*Rhinanthus crista-galli*); *Calocalpe undulata*, netted by by son in a marshy locality, together with some nice forms of *Lomasipilis marginata*, *Perinephila lancealis*, etc.; *Procris geryon*; *Loxostege verticalis*; and during the summer months, *Pyrausta purpuralis*, *P. punicealis*, *P. cingulata*, and *P. nigrata (anguinalis)*, were to be seen on bright sunny days flitting about the herbage in suitable spots.

COLLECTING NOTES.

NOTES ON VARIATION FROM THE WORTHING MUSEUM (*Continued from p. 16*).—*I. lathonia*.—There is no English specimen, but the usual absence of this species here is quite unaccountable. It is certainly not due to climate. It is common in N. France (indeed all over Central Europe) and extends into Finland which produces quite large specimens; nor can it be due to absence of food plant. If it is claimed that it fails to establish itself because it is captured when it appears, that does not explain why it did not establish itself here long ago when there were no collectors to interfere with it; for surely there must have been immigrants centuries before there were collectors. Abroad summer and autumn specimens are usually larger, often much larger, than spring ones. The largest here are from Spain. (These by the way are an excellent advertisement for toluol for removing grease.) The next largest are from Corsica, the Rhone Valley and Finland—the last fact

is remarkable. The three silver spots at the apex of the forewing on the underside often appear as pale spots on the upperside, oftener in the ♀ than the ♂, and are sometimes very conspicuous. There are such specimens here, ♂ from Eclépens and Finland, ♀ from Follaterre (Rhône Valley), Sambuco (Val Maggia), Vizzavona (Corsica), La Granja and Salonica.

A. aglaia.—There is no considerable difference except in the ground colour of the ♀s. Of the few English districts represented here (Cotswolds, Kentish Downs, Lake District and Witherslack) the last are certainly the finest; in one ♂ the spots near the base of the forewing coalesce into a blotch, and there is a nearly similar ♀. The species is not uncommon on the Downs here, but flies rapidly along very steep slopes. The yellow band on the underside hindwing often tends towards orange, as in specimens from the Cotswolds, and also from Faido, Luan and Vallorbe in Switzerland and Samoussy in France. The green of the underside is often duller in mountain specimens, but those from M. Revard and the Grande Chartreuse are quite light, while Witherslack specimens tend towards the darker form. There are very small forms (ab. *nana*) from Norway and from the Abruzzi, but some of those from the latter locality are of fair size.

A. adippe.—(This appears to be correct after all). English specimens are disgracefully few. It occurs near here, but I hunted all the woods that I could get at this summer (1941) in vain. There are only specimens from the New Forest, Wolford (Warwickshire) and Witherslack. Some of those from the last locality are almost as green on the underside as the Spanish *chlorodippe*. There is a very remarkable underside from the Alpes Maritimes with the ground colour a lightish yellow throughout, without a touch of green. I have found *adippe* very rare in Central Italy, having only seen one very large ♀ from Assisi, and another, also very large, from Subiaco, the latter exactly corresponding to the ab. *dives* of *D. paphia*, being washed with gold all over the pattern of the underside. In North Italy it is quite common mostly in the *cleodoxa* form but with a good many *intermedia*. This is also the case with the Val Maggia. The Spanish forms *chlorodippe* and *cleodippe* are both represented, the latter by one specimen by no means too good. There are specimens of the ab. *virgata* from Switzerland, one very marked one coming from Aigle.

B. euphrosyne.—Of the three English series those from Wolford (Warwickshire) and Horsley (Surrey) are rather small, those from Chiddingfold (also Surrey) are larger; the one Scotch specimen, from Rannoch, larger still. Large specimens come from Aix-les-Bains and from the Riviera and about the same size from valley and subalpine localities in Switzerland and also from Mt. Olympus. Mountain specimens, whether from Switzerland, France, the Pyrenees or the Tyrol are smaller, and, except from M. Revard, darker, though occasional large specimens occur among them, e.g. from the Engadine, the Bortel Alp and the Laquinthal. Those from Rognan (Norwegian Lapland) are small and rather dark, but only those from Quickjack are v. *finjal*. The darkest of all is a specimen from Preda on the Albula Pass. There is more suffusion at the base of the hindwings upperside in English specimens than in any others, except in the Preda specimen, and also in one from Alpien above the Simplon Pass, south side. The eye spots

in the outer band underside hindwing are very conspicuous in Finland specimens, giving a resemblance to the *ossianus* form of *aphirape*; they have sometimes light centres.

B. selene.—Much more local than *B. euphrosyne*; the only specimens here are from the New Forest, Witherslack and the Lake District; the first are good sized specimens, the others generally smaller. Scotch specimens are about the same size as those of the first brood from Brittany, the second brood being smaller. Very local in Switzerland north of the Alps. It occurs near Montreux, but by no means every year, at Noville and Bouveret. From Hinterzarten (Black Forest) they are rather large and dark with rather more silver than usual on the underside. Belgian specimens from Hockai are also rather dark, those from Virton specially so on the underside. Specimens from S. Finland are all small, but some of those from Savonlinna in the south-east are tiny, scarcely bigger than a large *P. icarus*. There is a very fresh specimen from this locality, not one of the very small ones, with a pale yellow-brown ground colour. There are four specimens of the var. *castiliana*, without any silver on the underside, which might easily be supposed to be *B. hecate* by any one not well acquainted with the latter.

M. aurinia.—There are only three sets of specimens from English localities, Wolford (Warwickshire), S. Devon and Carlisle. The first are much the largest and lightest, the Carlisle specimens are rather darker than those from S. Devon, the ♀s of the latter are not larger than the ♂s, whereas in all other cases the ♀s are the larger, often much the larger. There is a fine and variegated series from Ireland, race *hibernica*, including one very large ♀, but so far no Scotch specimen (race *scotica*). There are two very different series from Belgium, one from Virton rather large and light, with all the dark markings narrow, the other from Hockai, small and dark, the yellow of the lighter bands generally conspicuous, though one specimen is almost unicolorous. The Swiss specimens are nearly all from the Canton of Vaud, a long series from Sonzier, above Montreux, varying greatly in size and markings, but tending towards the unicolorous form and rarely showing any strongly contrasted colouring. A pair from Brig are much more brightly coloured, while a pair from Eclépens, a small ♂ and a large ♀, tend towards the unicolorous form, which is still further developed in an underside ♂ from the Moléson. From France there are very different series. From the Rennes district specimens of moderate size, the ♂s with much more contrasted colouring than the ♀s, but there are two very small ones that I have placed near to *debilis*, a tiny form often as small as *M. merope* from La Roquette, varying a good deal in colour but with the red and yellow always distinct and always heavily marked with black, whereas the two very small ones from the Rennes district have much narrower black markings and brighter colouring. From Aix-les-Bains are two pairs in which the yellow tends to red, one ♀ being very large, and from the Col du Granier a short series with ♂s about the same size but ♀s much smaller in proportion than usual and more variegated in colour. A series from the Riviera is of course of the race *provincialis*, large and bright, but with no contrasting colours. By far the largest and brightest are of the race *beckeri* from Spain, those from Portugal being smaller and duller. A few from *M. Auranci* might have come from Sonzier.

A few words may be worth while about the two species which have been regarded as forms of this species. I gave long ago my reasons for regarding *M. merope* as a distinct species and there is no need to repeat them now. All the specimens have a washed-out appearance, those from the Alpe Pianascio and the Hautes Alpes the least so, the latter being also the least heavily marked with black. Some from the Simplon Pass are larger than Carlisle *aurinia*, and much larger than the race *debilis*. With regard to the magnificent *M. desfontainii*, I think there can be no doubt that it comes directly through the *beckeri* form of *aurinia*, but its race *gibrati* from Morocco has travelled further away from its ancestor; this very handsome form (existing, I believe, in very few collections) is here represented by eight specimens, four ♂s and four ♀s; they are of a very dark red ground colour with heavy black markings. The race *boetica*, which is much nearer to *beckeri*, is represented by series from Albarracin and Ronda, the latter is the larger and has much less decided markings on the underside.—(To be continued.)—Rev. GEO. WHEELER, M.A., F.R.E.S.

TETRIX CEPEROI, I. BOLIVAR (ORTHOP.) IN KENT.—After studying Dr Uvarov's very clear key and illustrations for the separation of this species from *T. subulata* in *Journ. Soc. Brit. Ent.*, 2, 72-5 (1941), I find that I took it in September 1935 near Minster in the Isle of Sheppey. The situation was a dry broken clay cliff face, which agrees with Dr Blair's observations in the same journal (p. 116) that this species prefers such situations while *T. subulata* prefers moist localities.—R. M. GREENSLADE, "Merryweather," East Malling, Kent.

QUERIES AND ANSWERS.—I have one or two notes about subjects raised during the past few years which I should like to record now to keep them up to date. They are as follows:—*Monima (Taeniocampa) opima*, Hb.—in the Midlands (*Ent. Rec.*, liii, No. 7-8, p. 80, 1941).—The question is asked as to whether this species, usually connected with more northern localities, is often found in Midland counties. I have taken this species, though not commonly, at Pebworth, Worcestershire (near Bidford-on-Avon) and also at Bradley Green, Wores., near Alcester.

Query. Sex ratio of over-fed larvae.—I have only once, to my knowledge, given luscious food to larvae on which they might over feed. I gave young dandelion buds and heads to larvae of *Eumichtis lichenæa*, Hbn., when I reared them in two successive years. I since learned that it was a risky proceeding, but I had excellent results, losing none. Out of a total of 45 imagines, 22 are males and 23 females, so that in that case there is no question of a preponderance of females. But at what period of what stage is an insect's sex determined? I do not mean when can it first be traced.

"A note on *Saturnia pavonia*." P. B. M. Allan (*Ent. Rec.*, lii, No. 1, p. 4, 1940).—This note shows that heat, under certain circumstances, produces cripples, particularly as far as the hindwings are concerned. I found a cocoon on the side of a road at Pebworth, Worcestershire, some years ago, that had been scorched by the grass there catching fire. I kept it and a ♀ emerged, with the left forewing completely missing and the thorax malformed as well as being quite bald. The colour was unimpaired.

Rearing *Agrotis ripae* pupae (*Ent. Rec.*, lii, No. 2, p. 22, 1940).—A note re the above telling of the difficulty of rearing pupae of *A. ripae*, Hbn., in shallow sand, reminds me that I had exactly the same trouble with *Leucania litoralis*, Curt., until I left them alone in sand not less than nine inches deep. Usually I take pupae out of earth or cocoons, and keep them in a tin box on damp cotton wool—unless I find instructions to the contrary from other rearers. I find it by far the most successful and easy way. Colonel C. Donovan, of Bourton-on-the-Water, introduced me to the method.

Ratio of yellow variety in *Lithosia griseola*, Hubn. (*Ent. Rec.*, xlix, No. 10, 1937).—Mr B. A. Cooper asks the ratio of the var. *flava*, Haw. = *stramineola*, Doubl., to the type form. I used to find both at Pebworth, Worcestershire, though not very common and when the yellow form occurred the type: var. ratio was about 3:1. I found, however, that the variety was very spasmodic in its appearance, and that for perhaps four consecutive years it would not be seen at all, then it would appear again for a year or two and then again be absent.

Moths at rest (Pebworth) (*Ent. Rec.*, xlviii, No. 2, p. 23, 1936).—I find I never answered Mr Nicholson's note concerning the grey walls of our house on which *C. nupta*, *B. perla*, and *P. chi* rest in daytime. He asks if the grey stone has lichen on it. My "grey stone" was misleading. Both houses referred to in the notes were very old, Elizabethan as far as the fabric and stone were concerned, and therefore covered in lichen, weathered and very much roughened from flaking. Perfect resting places.—P. SIVITER SMITH, Little Aston Park, Streetly, Staffs.

CURRENT NOTES.

To those interested in the Genus *Colias*, the series of articles on the N. American species of this genus, now running in the *Ent. News*, will be very interesting.

In the *Entomological News* for December is an account of a Mass-movement of *Libythea bachmanni*, ssp. *larvata*, which was observed in July 1940 in the hot valley of the Rio Grande, Texas. Hundreds of thousands of this "snout" butterfly were met crossing the road.

AMONG Separates we have received recently are two by T. Bainbrigge Fletcher, R.N., F.L.S., etc. (1) A further Continuation of his Notes on the "Microlepidoptera of Gloucestershire," extracted from the *Proceedings of the Cotteswold Club*. It deals with the *Cosmopterygidae*, the *Oecophoridae*, the *Orneodidae*, the *Aegeriidae*, the *Heliozelidae*, the *Glyphipterygidae*, and the *Elachistidae*. (2) A new Eucosmid moth from the Ranchi district of India, reprinted from the *Ind. Jrnl. of Ent.* From Mr E. P. Wiltshire, F.R.E.S., Notes on "New Lepidoptera from S.W. Iran (Persia)," contributed to the *Jrnl. Bombay N.H. Socy*. The author describes New Lepidoptera, both species and races. Among the novelties are *Melitaea consulis*, *M. phoebe*, ssp. *sarvisiana*, *Eriogaster amygdali*, *Monima mithras*, *Brachionycha atossa*, three *Amathes* forms, a *Crymodes* form, etc. In his descriptions he shows to what existing species the newly described species are allied by comparison.

THE *Irish Naturalist* for March 1941 contains two records of attacks made by a predator on the females of *Tipula gigantea*, the "giant crane-fly." In both records the *Tipula* was ovipositing.

WE hear that the well-known firm of Watkins & Doncaster, Naturalists, of the Strand, London, is under new management. It has been acquired by Mr R. L. E. Ford, as sole proprietor. We wish him success.

MR McDUNNOUGH has described some New Species of the *Coleophoridae* (Microlep.) from the Ottawa region, in the *Canadian Entomologist*. He gives no figures of the three species, he compares them with no existing species, but gives figures of the genitalia of each. Surely the author compared these with other species to find out if they were new. Why not publish the results of his examination?

THE GENITALIA OF THE BRITISH RHOPALOCERA AND OF THE LARGER BRITISH MOTHS, by F. N. Pierce, F.R.E.S., and Bryan P. Beirne, Ph.D., F.R.E.S., appeared during last year and nearly concludes a life-long task; only the female structures of the *Noctuidae* remain to be considered. We must congratulate the senior author on the persistence with which he has work in spite of losing one after another of his co-workers and with the poorest of support by the entomologists of the country. The meagre list of subscribers is a miserable failure to recognise the work of a gifted and successful student. 25 personal copies and 14 for institutions and booksellers in this country and America is a sorry show for a subscription list.

THE Smithsonian Institution of the U.S. National Museum has distributed a *Revision of the N. American Moths of the Family Oecophoridae*, a book of nearly 300 pp. and 48 plates of detailed structural figures some 289 in number. There are extensive keys to all the genera and each species is dealt with under the following headings usually in a thorough manner: Synonymy, an *ad hoc* description of each species, many of them without reference to a nearly related species, male and female genital structures (of which well-drawn figures of all forms are given), wing expanse, place of type form, type; Locality, Distribution, Canadian Records, United States Records, Food plants, etc. There is not a single figure of the perfect insect. All the new species at any rate should have been figured as a guide—not photographs, but exact drawings of the forewing with head, antennae and palpi, say twice natural size. If this method of illustration was extended to figures characteristic of genera, subgenera and groups in large genera, the work would have been of inestimable value to future students and save much laborious repetition.

A LETTER from Dr Malcolm Burr has just arrived. He would much like to hear from old friends and states how grieved he was to hear of the death of his old friend, Harry Eltringham. He has sent two articles for the magazine and continues his collecting and observations in his favourite group whenever opportunity offers. Letters sent to him c/o The Foreign Office, Whitehall, S.W.1., will be forwarded.

cept on the terminal margin, which forms a slight band of clear yellowish." Constantine, Algeria.

f. *batnaensis*, (Obthr.) Culot, *N. et G.*, I (2), 89 (1914).

FIG.—plt. 55, 16.

ORIG. DESCRIP.—"Forewings of a salmon-yellow with the marking strong in brown." Batna, Algeria.

ab. *rosina*, (Obthr.) Culot, *N. et G.*, I (2), 89 (1914).

FIG.—*l.c.*, plt. 55, 17.

ORIG. DESCRIP.—"Forewing of a rose-salmon, with the markings but little apparent, except the points of the subterminal line, which remains well marked in brown." Constantine, Algeria.

ab. *gilvagella*, Strand., *Arch. f. Naturg.*, LXXXI (1915), A.12, p. 149 (Hamp., *Lep. Phal.*, VI, 504 (1906)).

ORIG. DESCRIP.—"Head, thorax and forewings yellower; the deep brownish colour of the forewings broken up showing a series of spots, the subterminal marks very black." Province (S. France): England.

"Head, thorax, and forewing much yellower, the last with the fuscous suffusion reduced to macular bands, the points before the subterminal line black and prominent." (Hamp.)

ab. *xantheago*, Schaw., *Verh. zoo.-bot. Gesell. Wien*, LXXI, 157 (1921).

ORIG. DESCRIP.—"The pale ochre-yellow form." This was named as a form of *erythrago*, Warr. = *palleago*, Hb. (442).

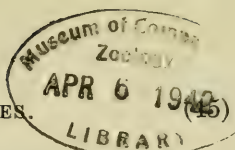
ssp. *bathi*, Döring, *Int. ent. Zt.*, XXVIII, 3 (1934).

FIGS.—*l.c.*, plt. 1, 1, 4.

ORIG. DESCRIP.—"A subspecies with yellow ground colour of forewings, showing a streak in brownish, and white hindwings very slightly tinged with brownish, in which the slight browning present in *gilvago* on the inner margin is absent (five examples) or only very indistinctly observable (two examples). The central brown forewing marking of the sharply marked specimens tends to obsolescence, a suggestion of the corresponding form of the nearest allied species. The basal angle up to the first transverse line and the central area between the central shading and the outer transverse line are coloured light brown. Orbicular and reniform are distinctly produced in brown, the latter filled in with light-brown. The dark brown margined central spot is filled in yellowish white, which is also the case in the outer transverse line. The under side of the type form is silvery-yellowish-white, in the typical male is a light brown band on all four wings slightly developed. A central spot—as we often find in *gilvago*—is not present on the hindwing. The cilia are the colour of the wings and appear in the male only slightly spotted. The female type resembles the male in marking in the hair, only the forewing is lighter yellow." Turkestan.

f. *fuscescens* (of ssp. *bathi*), Döring, *Int. ent. Zt.*, XXVIII, 5 (1934).

ORIG. DESCRIP.—"With more distinct marking and slightly darkened central area, to unicolorous reddish specimens. The under side of this form is strongly brownish in tone."



Xanthia, Ochs. & Tr. (1816-25), Dup., H.-S., Gn., Barr., Stdgr., Splr., (Sth.), Culot [*Orthosia*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Cosmia*, Ochs. & Tr. (1816-25), Hamps., Warr.-Stz., Drdt.-Stz.: *Melinia*, Hb. (1821), Sth.] *ocellaris*, Bork. (1792).

Tutt did not deal with this species and only referred to it in the Appendix to Vol. iv, p. 122, in reference to *gilvago*, of which species it had been taken as a form by many authors on the Continent. He quoted Fuchs re this supposed relationship, but ended "I believe the union of *ocellaris* and *gilvago* has never got beyond this" (supposition) and "have not been bred from the same batch of eggs." It was first recognized and described by Borkhausen in 1792.

ocellaris, Bork., *Naturg.*, IV, 647 (1792).

ORIG. DESCRIP.—"The ground colour of the forewings is a mixture of vermilion and grey, but in a much paler tint than in *miniosa* and the veins stand out distinctly as light streaks. The transverse lines are very pale: the first is waved, the discal is arched and both are dark margined on the side turned away from one another. Between them lie the usual stigmata, orbicular, and reniform, which are filled in grey and pale vermilion. In the lower part of the reniform lies a pure white somewhat glossy spot, which is enclosed with black and resembles an eye. Near the hind margin there is also a very indistinct paler line. The hindwings and the undersides of all the wings are unicolorous white. The palpi are grey. The head is grey with pale reddish tinge. The antennae are whitish on the back and inner side pale brownish. The thorax is grey suffused with pale reddish, and the abdomen and the feet are similarly coloured."

Culot, *N. et G.*, I (2), 89 (1914), in dealing with *ocellaris* referred to the confusion which existed between *gilvago* and *ocellaris* and remarked that "the confusion seems impossible to me." This is how it appears to me also. In *ocellaris* the forewings are quite pointed and subfalcate at the apical angle, the surface texture of the wings is quite smooth with a tendency to be glossy, the two stigmata are well expressed in certain lights, there is a white dot at the base of the reniform in *ocellaris*, but not present in *gilvago*, the markings are definite but only very slightly darker or lighter in shade than the ground colour, the colour of the marking of *gilvago* in no way resembles that of *ocellaris*, nor is the arrangement of markings similar, the "pile of bricks" arrangement of the wide submarginal band formed by veins and transverse lines, and thus resembling that in *helvola* (*rufina*) has nothing comparable to it in *gilvago*. Even were the whole of the markings suppressed the texture noted above and the subfalcate wing-shape would decide the species.

Tutt, *Brit. Noct.*, IV, *Append.*, 122 (1892): Meyr., *Hand.*, 62 (1895): Barr., *Lep. Br. I.*, V, 376, plt. 231, f. 3 (1899): Stdgr., *Cat.*, III ed., 208 (1901): Hamp., *Lep. Phal.*, VI, 505 (1906): Splr., *Schm. Eur.*, I, 253, plt. 46, 25 (1907): South, *M.B.I.*, II, 22, plt. 10, f. 11 (1908): Warr.-Stz., *Pal. Noct.*, III, 155, plt. 28h, i (1911): Culot, *N. et G.*, I (2), 89, plt. 55, f. 18, plt. 56, f. 1-2 (1914): Meyr., *Rev. Hand.*, 122 (1928): Drdt.-Stz., *Pal. Noct. Sup.*, III, 155, plt. 19d (1934).

Hb., *Samml. Noct.*, 193 (1800-3), under the name *gilvago* gave an excellent figure of *ocellaris*. This no doubt was a factor in the long continued confusion with *gilvago*.

Treit., *Schmett.*, V, 373 (1825), did not accept *ocellaris*, Bork., as a good species and noted that (1) The very distinct description of *ocellaris*, Bork., is in agreement with the *palleago*, Hb., 192; (2) Borkhausen in his Catalogue of his collection had marked one specimen "*palleago*, Hb., fig. 442, the fourth example from Wien." No doubt these remarks were a factor in the long time confusion between *gilvago* (*palleago*) and *ocellaris*.

H.-S., *Bearb.*, II, 203 (1849), took *ocellaris*, Bork., as a synonym of *gilvago*.

Gn., *Hist. Nat.*, V (1), 396 (1852), treated of this species at some length and stated that it is "perfectly distinct from *gilvago*, in appearance, by the more pointed apex of the forewing, by its nervures which stand out from the ground colour, and by its hindwings which are of a purer white. He refers to the ocellated reniform spot.

He recognized two distinct forms, the *lineago*, Godt., and the *palleago*, Hb. (192) (which corresponds to the *palleago*, Hb. (442) of *gilvago*.)

Splr., *Schm. Eur.*, I, 253, plt. 46, f. 25 (not 57 as in the text), gave a figure of which he said in the text had "the inner transverse line incorrectly zigzagged, the outer not sufficiently curved on the inner side; the hindwing on the costa and discal area not sufficiently whitish." He referred to only one form, *lineago*, with strongly emphasized marking. He did not mention any resemblance to *gilvago*.

Hamp., *Lep. Phal.*, VI, 505, included *lineago* and *intermedia* as forms and recognized f. 193 of Hüb. *gilvago* another form.

South, *Moths Br. Is.*, II, 22, plt. 10, fig. 11, gave a figure of an extremely pale example with very faint obsolescent marking. But it has the slightly falcate shape of forewing, the white eyespot in the centre of the wing and the "piled brick" feature of the hind marginal band can be seen in a strong light helped by a lens.

Warr.-Stz., *Pal. Noct.*, III, 155, plt. 28h, i (1910), gave six figures: ♂ and ♀ *ocellaris*, ab. *palleago*, Hb., an extremely pale form, ♂ and ♀ ab. *lineago*, Gn., a very dark form, and ab. *carneago*, a new form, pink with very faint marking, and ab. *intermedia*, Hbch.

Culot, *N. et G.*, I (2), 89, plt. 55, f. 18, plt. 56, f. 1-2 (1914), gave three figures. 18 is a typical form, a reddish-yellow lightly tinted with reddish-grey in places, notably in the subterminal area. The lower lobe of the reniform is a whitish dot surrounded by a brown circle. 1 is *lineago*, Gn.; 2 is *palleago*, Hb. (fig. 192).

Drdt.-Stz., *Pal. Noct. Supp.*, III, 154, plt. 19d (1934), gave a revised article to the main Vol., including five forms with a figure of ab. *intermedia*, Habich.

They gave fairly good figures of typical ♂ and ♀ *ocellaris*, hardly with the delicate flush of the surface in fresh examples; *palleago*, a very pale ochreous; *lineago* ♂ and ♀, very like the *suffusa* form of *gilvago*; and *carneago*, with pink terminal area (should also have the basal area dusted with pinkish-grey).

They also, *l.c.*, III, 155 (1934), said *lineago* was heavily dusted with dark grey, and included ab. *punctata*, Heinr. This last they figured on

plt. 19d, and remarked that "This form is that which is so often wrongly diagnosed, with pale ochreous to olive-grey ground colour, with bluish-grey spots and bands, whereby in many specimens a striking resemblance is created to certain *gilvago* forms. *Ocellaris* forms are, however, generally easily recognizable by the more protracted and falcate apex of forewings."

FIG.—*l.c.*, 19d. This figure has a fairly wide inner band well bounded by thick lining of brown, the outer band is similar but curved inward on the lower part of the wing but outward on the upper half of the wing. These two narrow bands are quite clear of marking. Reniform just traceable, orbicular obsolescent, submarginal spots emphasized and a few markings between this row and the band, all dark brown.

Of the Variation Barrett, after describing the species as he knew it, remarked:—

So far as I am aware this is the usual form taken in this country, but on the Continent it appears to be more usually of a yellower colour and more like *gilvago*, while, in its Asiatic range, of the more orange-brown, uniformly coloured variety. This is known as var. *lineago*, and it is exceedingly remarkable that our few specimens (1898) should so much more closely resemble Eastern examples than those of the adjacent European countries. Possibly there is a good deal to be learned as to its range and variation—certainly the dealers in Lepidoptera abroad are very apt to send over *gilvago* by mistake for this species. The difficulty is complicated with them, by the existence abroad of a pale yellow form of the present species, sometimes called var. *palleago*. (Only a dozen examples taken in Britain were known when the above was published. Since then it has been taken and bred in numbers in various localities.)

Draudt in *Stz. Pal. Noct. Supp.*, III, 154 (1934), dealt in the same drastic way with Warren's account of *ocellaris* as he had done with *gilvago*. He said that the figure of the typical form in the main volume, plt. 28h, was "fairly recognizable" but "might be a shade more reddish-yellow." He recognized *carneago*, Warr., *lineago*, Gn., *palleago*, Hb. (192), *punctata*, Heinr., and *intermedia*, Habich., of which he gave a figure, *l.c.*, 19d.

The species has a very delicate surface of the forewings never seen in *gilvago* and only approached by the heavier colour of *miniosa*.

The shape of the wings of *ocellaris* is not like that of *gilvago*. The forewings of *ocellaris* are very pointed and falcate at the apical angle while they are blunted and even rounded at the apex in *gilvago*.

I am much indebted to Mr A. J. Wightman for sending me a series of very fine bred examples from his collection to examine; besides these I have a few British examples and several from Vienna from my friend, the late Carl Höfer.

Mr A. J. Wightman recognises: 1, typical; 2, grey; 3, red; 4, variegated; 5, extreme yellow *ocellaris*.

He remarks on Seitz figures: "Plate 28, *griseo-signata* agrees well with variegated *ocellaris*. If Fuchs took this form with his *ocellaris*, he might well suppose both species occurred in his poplar avenue. On

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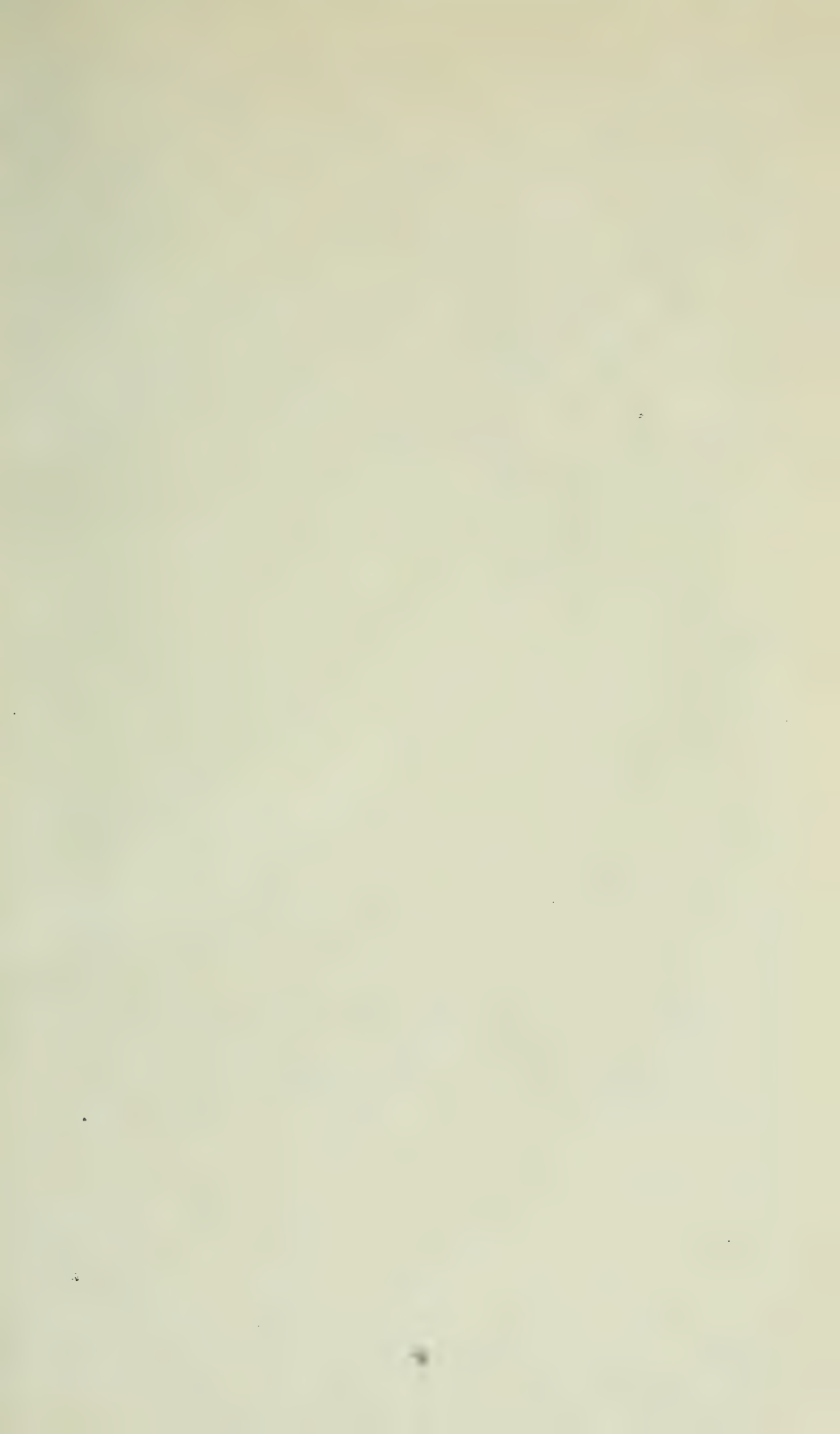
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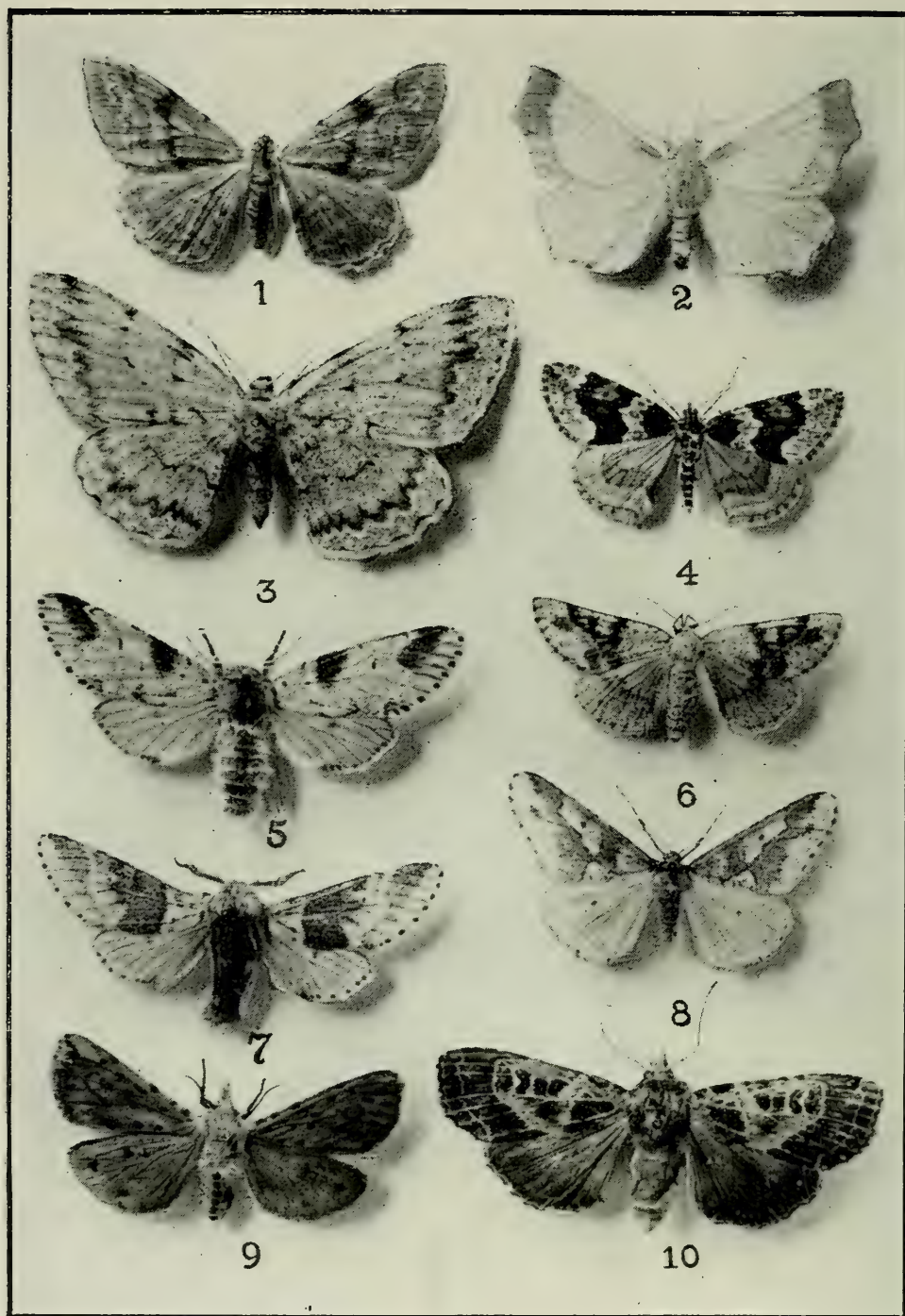
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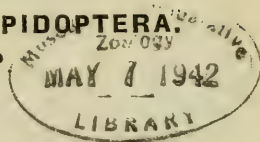
ABERRATIONS OF BRITISH MACRO-LEPIDOPTERA.

NEW ABERRATIONS OF BRITISH MACROLEPIDOPTERA.

By E. A. COCKAYNE, D.M., F.R.C.P.

(Plate II.)

13,820



Looking at my collection recently I saw several aberrations of British Macrolepidoptera which seemed to me to be worthy of a name, and I am taking this opportunity of describing and naming them.

Notodonta dromedarius, L., ab. **niger**, ab. nov.

Forewings nearly black with faint rust coloured markings in the usual situations, but with the pale transverse lines absent; thorax and abdomen nearly black; hindwings greyish black; under surface grey-black with the pale transverse lines obsolete or nearly so.

Type. Female. Near Manchester. Bred vii.1938. B. H. Crabtree.

Paratype. Male from the same locality bred vii.1939. B. H. Crabtree.

Mr Crabtree tells me that the form occurred regularly in a restricted locality, but that most of the birches there have been destroyed since the outbreak of war. I have also seen specimens from Formby.

It is much blacker on both surfaces than either ab. *perfuscus*, Haw. (*Lep. Brit.*, 1803, p. 100; Stephens *Ill. Brit. Lep.*, Pl. 14, fig. 2) or ab. *hibernica*, Caradja (*Iris*, 1895, 8, 97). The latter, if I have identified it correctly, is slightly darker on the upper surface than ab. *perfuscus* and it lacks the pale transverse lines and other markings, and on the under surface is dark brown with the pale transverse lines indistinct. I bred this form in 1902 from Sheffield larvae and I believe it to be widely distributed in the north of England. It is said to occur also in Scotland and Ireland.

Cerura hermelina, Goeze (*bifida*, Hb.), ab. **costimacula**, ab. nov.

The median band is reduced to a single mark on the costa reaching the median nervure and a few black scales beyond it; the costal mark is outlined by a complete narrow orange stripe.

Type. Female. Bedford. 19.v.1909. Bred by W. S. Brocklehurst (fig. 5).

This beautiful form is a further development of ab. *intervalla*, Kosh., in which the median band is broken into a costal and an inner marginal part (*Jahrb. Mus. Martjan*, 7, 71).

Cerura hermelina, Goeze, ab. **laticincta**, ab. nov.

The median band is extended outwards to the discoidal spot.

Type. Male. Locality unknown. C. A. Briggs and Vauncey Harpur Crewe collections (fig. 7).

Phalera bucephala, L., ab. **olivapicata**, ab. nov.

In the apical area buff is replaced by bluish green or olive green, whilst the rufous part is either blackish brown or is unchanged in colour.

Type. Male. Forres. Bred. British Museum (Tring). *Entomologist*, 1907, 40, 217, text figure.

Paratype. Female. Ramford. 11.vi.1895. Hanbury Coll.

Spilosoma lubricipeda, L. (*menthastri*, Esp.), ab. **nigrescens**, ab. nov.

The fore and hindwings and thorax are greyish black; the abdomen is normal, orange with black spots on the upper surface, white on the sides and under surface with the usual lateral black marks.

Type. Male. Walthamstow. Bred by C. L. Withycombe and given to me shortly before his death (fig. 9).

The specimen has not the deep smoky blackish brown colour of the male taken near Leeds by Landcave and figured by Mosley (Pl. 51, fig. 1), and in this specimen such scales as remain on the abdomen are blackish brown. Presumably it is a different mutation.

Naenia typica, L., ab. **albifusa**, ab. nov.

There is a great increase in the white in the median band, external to the antemedian and internal to the postmedian from nervure 4 to the inner margin, where these two white stripes unite, and also along the costa. In other respects the moth is normal.

Type. Female. Chelford, Cheshire, 26.vii.1930. E. Aubrook. Crabtree coll. (fig. 10). There is a similar specimen, taken in S. Yorkshire by G. T. Porritt, figured in Barrett *Brit. Lep.*, vol. v, Pl. 217, fig. 1c.

Chloroclysta siterata, Hufn., ab. **fasciata**, ab. nov.

The basal area and median band are blackish green except for a light green area round the discoidal spot. The rest of the forewing is much paler than usual and almost devoid of markings. There is a fairly distinct transverse band on the hindwing.

Type. Female. New Forest. W.H.H.; Hanbury coll. (fig. 4).

I have two males and have seen several other specimens of this form. Mr Austin Richardson showed a fine example at the Annual Exhibition of the South London Entomological Society, 1941. Evidently this banded form is not sex-linked like that of *Oporinia dilutata*.

Erannis defoliaria, Cl., ab. **pallidaria**, ab. nov.

The markings are the same as in the dark banded form ab. *obscura*, Dahlström, but the basal area and the bands are very pale and show a varying mixture of pale bluish grey and pale reddish brown. The freckles are reduced in number and almost invisible without a lens owing to their pale colour.

Type. Male. Chingford. 10.xii.1938. E. A. Cockayne.

Paratype. Male. Loughton. 21.xii.1929. E. A. Cockayne.

Both are in bred condition and are the only ones I have taken. The bands in ab. *obscura* from Epping Forest are unusually dark, and the existence of this dilute mutation is very interesting.

Erannis defoliaria, Cl., ab. **tangens**, ab. nov.

The pale median area is broken by a union between the ante and postmedian bands midway between nervures 1 and 2.

Type. Male. Loughton. 18.xii.1926. E. A. Cockayne (fig. 8). This is the only specimen I have seen and it must be a rare form.

Ennomos quercinaria, Hufn., ab. **clara**, ab. nov.

The basal, antemedian, and postmedian lines are absent. There is an ill-defined brown area at the base of the forewings and a complete broad brown marginal band; the discoidal spot is small and indistinct.

Type. Male. Bedford. 4.ix.1909. W. S. Brocklehurst (fig. 2).

I have not seen another example of this fine aberration.

Boarmia punctinalis, Scop., ab. **conspicuata**, ab. nov.

This is a pale weakly marked form with a strongly developed broad wavy subterminal line in both fore and hindwings. The W-mark between nervures 4 and 6 in the forewings is very distinct.

Type. Female. New Forest. 15.v.1904. Bred. Hanbury Coll. (fig. 3).

Paratypes. Two males, bred 15 and 17.v.1904; three females, two bred 15.v.1904, and one 18.v.1904, Hanbury Coll.; one female, vi.1904, L. F. Hill; and one female, vi.1906, Harwood. All are from the New Forest and probably those from the Hanbury collection formed part of the same brood.

Cleora repandata, L., ab. **coarctata**, ab. nov.

The ground colour is a soft brown with none of the usual speckling, and on the forewing the transverse lines are concentrated to form a narrow black median band, which is widest at the discoidal spot.

Type. Female. Whitby, 1909. Massey Coll. (fig. 1).

Paratype. Female with the same data.

Dyscia fagaria, Thnbg. (*belgiaria*, Hb.), ab. **signata**, ab. nov.

All the dark markings on the forewing are greatly intensified; the ante and postmedian lines are very broad and unite towards the inner margin, the discoidal spot is large, and the spots external to the postmedian are increased in size. In the median area there is black scaling along the subcostal and median nervures and nervure 2. In the hindwing the postmedian is well defined and there is some black scaling along the nervures in its vicinity.

Type. Female. New Forest. F. Gulliver. Crabtree Coll. (fig. 6).

Zygaena trifolii, Esp., ab. **carnea**, ab. nov.

The red colour on both fore and hindwings is replaced by pink.

Type. Male. Bagley Wood, Oxford. 27.vi.1904. Bred by E. A. Cockayne.

This is comparable with *Z. lonicerae*, ab. *carnea*, Spuler (*Schmett. Europ.*, p. 164).

LEGEND.

- Fig. 1. *Cleora repandata*, ab. *coarctata*.
- Fig. 2. *Ennomos quercinaria*, ab. *clara*.
- Fig. 3. *Boarmia punctinalis*, ab. *conspicuata*.
- Fig. 4. *Chloroclysta siterata*, ab. *fasciata*.
- Fig. 5. *Cerura hermelinea*, ab. *costimacula*.
- Fig. 6. *Dyscia fagaria*, ab. *signata*.
- Fig. 7. *Cerura hermelinea*, ab. *laticincta*.
- Fig. 8. *Erannis defoliaria*, ab. *tangens*.
- Fig. 9. *Spilosoma tubricipeda*, ab. *nigrescens*.
- Fig. 10. *Naenia typica*, ab. *albifusa*.

PUPAL MANDIBLES IN THE CURCULIONIDAE.

By H. DONISTHORPE, F.R.E.S., F.Z.S., etc.

(Continued from p. 23.)

Lesne in 1899 publishes evidence which seems to show that in *Barypeithes pellucidus*, Boh., at least, these mandibles are used to enable the newly hatched beetle to dig its way out of the soil:—" Parmi les Curculionides, la vaste sous-famille des *Brachyrrhinidae* est caractérisée par la présence, chez l'adulte, au moment de l'éclosion, d'appendages fortement chitinisés, généralement pointus au bout et incurvés dedans, qui sont insérés dans la partie apicale et sur la face externe de chaque mandibule. Ces appendices tombent d'ordinaire peu de temps après l'éclosion. D'ailleurs, chez la nymphe, leur développement complet paraît précéder celui de toutes les autres parties du squelette.

Il ne semble pas que l'on ait encore déterminé le rôle dévolu à ces organes transitoires. C'est pourquoi nous croyons utile de faire connaître l'observation suivante.

Vers la fin du mois d'avril 1890 nous avons en l'occasion de récolter dans un jardin, à Asnieres (Seine), les premiers états de l'*Exomias pellucidus*, Bohem. L'insecte vivait à une petite profondeur dans le sol, au pied d'un Marronnier d'Inde. Ayant placé dans des tubes de verre remplis de terre des nymphes âgées et des adultes fraîchement, éclos et munis encore de leur appendices mandibulaires, nous pûmes nous rendre compte de la façon dont l'insecte parfait se fraie un passage vers la surface du sol. Arc-bouté dans sa loge souterraine, le Charançon écarte ses mandibules et saisit un grain de sable entre leurs longs appendices; il reploie ensuite la tête sous le prothorax et dépose le grain entre ses pattes antérieures. Puis il saisit un second grain de sable, le dépose encore audessous de lui, puis un troisième, et creuse ainsi peu à peu un terrier qui se comble au fur et à mesure en arrière. Cette observation a été répétée à plusieurs reprises. Elle montre que chez l'*Exomias pellucidus* au moins, les appendices transitoires dont nous parlons sont des organes de fouissage d'un genre tout particulier."

In 1936 van Emden demonstrated that certain genera, *Sitones*, *Eugnathus*, etc., in the *Sitonini* possess homologous organs to the pupal mandibles in the *Brachyderinae*, which shows that they are more nearly related to that sub-family than was supposed by many authors hitherto: " Das Museum für Tierkunde zu Dresden besitzt nun einen *Eugnathus alternans*, Fhrs. von Singapore mit Mandibelanhang. Letzteres Gebilde (Abb.1.) sieht zwar wesentlich anders aus als bei *Psalidium* usw., vermag aber doch vielleicht die Kluft zwischen den *Brachyderinae* und *Sitonini* zu verkleinern. Freilich lässt es andererseits die Annahme zu, dass auch *Phanerognatha* ein solches Anhangsorgan besitzen können, das eben bloss äusserst selten erhalten bleibt²⁾. Zudem lässt nur die übergreifende linke Mandibel den Anhang zu wenigstens im Imagoleben, und die Narbe, die nach seinem Abfallen zurückbleibt, ist an den meisten Stücken infolge Abnutzung der Mandibelschneide verschwunden. Sehr frische *Eugnathus* lassen sie jedoch recht deutlich erkennen. Frische *Sitona* besitzen an der entsprechenden Stelle, die hier zwischen den beiden Spitzenzähnen der linken Mandibel liegt, ein etwas mattes Grübchen, das wohl ein Überrest der Narbe sein dürfte. Bei den *Pachyrrhynchini*, denen eine eigentliche Mandibelnarbe ebenfalls fehlt,

scheint der regelmässig vorhandene breite Eindruck aussen und ventral zwischen den beiden Zähnen der Narbe homolog zu sein. Auch bei den meisten *Ottistirini* ist keine Mandibelnarbe sichtbar.

(*To be continued.*)

THE MORPHOLOGY OF THE MALE GENITALIA OF THE LEPIDOPTERA.

By BRYAN P. BEIRNE, Ph.D., F.R.E.S., F.L.S.

(*Concluded from p. 22.*)

THE PHALLUS AND ASSOCIATED STRUCTURES (fig. 2):—The *anellus* is the double-walled, usually membranous tube through which the phallus passes. It is situated on the ventral wall of the ninth segment between the bases of the valvae, and the *juxta* is situated on its ventral (or anterior) wall. The inner wall of the anellus, the *manica*, is continuous with the outer wall of the phallus, while the outer wall of the anellus is continuous with the membranous ventral wall of the ninth segment. In many groups the anellus is produced as a pair of arms, usually one on each side but both often more or less ventral, the *anellus lobes*. The phallus is the intromittent organ and passes through the anellus. Its walls are usually heavily sclerotized in the form of a tube which is open at its apex but closed and rounded at its basal end; this sclerotized tube is the *aedoeagus*. The apical part of the phallus, the *vesica*, is membranous and usually withdrawn within the aedoeagus but is reversible; it frequently has spines, or sclerotized plates, in its walls, the *cornuti*, which because of the vesica being withdrawn often appear to be attached to the inside of the aedoeagus. The *ductus ejaculatorius* enters the phallus dorsally near its base and passes up its length, according to Chappell (*Stylops*, 1934: 163) dividing into two, one arm passing through the vesica and opening to the exterior; the external opening of the ductus ejaculatorius is known as the *gonopore*. Occasionally the terminal part of the ductus ejaculatorius is feebly sclerotized. The *caecum phallus* is the rounded basal end of the phallus. The *crista* is a small hairy area or lobe (as in *Ectropis bistortata*) occasionally a well-developed, hairy arm, situated on either side of the anellus and between it and the bases of the valvae.

The morphology of the different parts of the phallus is straightforward. The anellus is the phallobase, the manica the endotheca, the aedoeagus the aedoeagus, and the vesica the endophallus or penis proper. In Pterygote insects there are typically two pairs of appendages besides the phallus on the ninth segment, the parameres, which are associated with the phallobase, and the gonopods; either of these pairs of appendages are developed as the clasping organs in different groups of insects. Mehta has shown that the valvae arise independently of the phallus and are therefore not the parameres but the gonopods, but the homologies of the parameres in Lepidoptera are more doubtful. From their position, arising from the edge of the phallobase, it would seem likely that the anellus lobes represent these structures, and there are no other structures in Lepidoptera which could be these organs, but their ontogenetic development has not been satisfactorily worked out.

THE EIGHTH SEGMENT:—The sclerites of this segment are often large and well-developed and form a protective covering within which the genitalia may be withdrawn. The *coremata* are extensile sacs, usually adorned with hair pencils or tufts or specialised scales, situated on either side, in many species.

The *eighth tergum* may be relatively very strongly sclerotized, particularly along its caudal edge, which may be produced into various arms, or projections; the sclerotized caudal edge has been called the *mensis dorsalis* and the scales along this edge are sometimes highly specialized. When there are two very large scales attached to the caudal edge near the lateral corners they are referred to as the *julienische organs* (as in *Maniola jurtina*). The *superuncus* (fig. 9) is a large, median, posteriorly-directed projection, which is homologous with the uncus (as in *Papilio* and *Colias*).

The *eighth sternum*, often referred to as the *abdominal plate*, is in a great many groups more strongly sclerotized than the sterna of the more anterior segments, and its shape is often of considerable taxonomic value (as in Notodontidae). Its caudal edge (the *mensis ventralis*), in particular, may be very much thickened and produced into various projections. There are commonly two such projections which are in the form of arms and sometimes asymmetrical, the *octavals* (as in *Oporinia autumnata*). The *mappa* is a loose semicircular flap, clothed with long scales, covering the octavals, in certain *Geometridae*.

The more anterior abdominal segments usually show few or no modifications connected with the genitalia, but the shapes of the sclerites of the first two segments are often of value in indicating relationships between different groups.

TABLE SHOWING THE MORPHOLOGY OF THE MALE GENITALIA IN LEPIDOPTERA.

Structure.	Name in Lepidoptera.	Additional Structures in Lepidoptera.
<i>11th Segment.</i>	Anal tube.	
Tergum.	Scaphium.	—
Sternum.	Subscaphium.	—
Pygopods.	Socii.	—
<i>10th Segment.</i>	<i>10th Segment.</i>	
Tergum.	Uncus.	—
Sternum.	Gnathos.	—
<i>9th Segment.</i>	<i>9th Segment.</i>	
Tergum.	Tegumen.	Peniculi, pseuduncus, etc.
Sternum.	Juxta.	—
Gonopods.	Valvae.	Harpes, sacculi, transtillae, etc.
Parameres.	Anellus lobes.	—
Phallus.	Phallus.	—
Phallobase.	Anellus.	—
Endotheca.	Manica.	—
Aedoeagus.	Aedoeagus.	—
Endophallus.	Vesica.	Cornuti.
(Sclerotization of membrane between 8th and 9th segments.)	Vinculum.	Saccus.
<i>8th Segment.</i>	<i>8th Segment.</i>	
Tergum.	Tergum.	Superuncus, etc.
Sternum.	Sternum.	Octavals, etc.

EXPLANATION OF PLATE.

The male genitalia of the Lepidoptera: 1, Side view; 2, Longitudinal section; 3, 4, 6 and 7, Valvae, showing inner surfaces; 5, General view from below with valvae spread out; 8 and 11, Views from below with valvae spread out; 9, Side view; 10, Section through valva near base. All figures diagrammatic and hair and scales omitted. In figs. 9 and 11 the apical parts of the valvae and the anus are not drawn.

BUTTERFLIES OF PENANG ISLAND.

By L. RICHMOND WHEELER, Ph.D., M.Sc. (Lond.), F.L.S.

The butterflies listed here were collected during the years 1934-1938. From October 1934 till June 1936, while stationed in Butterworth, Province Wellesley, I visited Penang almost daily on duty, or pleasure, and stayed several times up the Hill. During the remainder of 1936 I was on furlough. From the end of January 1937 till April 1938 I resided in Penang and travelled all over the island visiting schools, Boy Scout camps, etc.; much of my spare time was spent in butterfly haunts including the Hill jungle.

Penang is 108 miles in area, about three-quarters as big as the Isle of Wight. It lies just above parallel 5° N., about 2 miles off the west coast of Malaya, and Sumatra stretches about 150 miles to its west. Much of the island is low and largely covered with coconut plantations, rice fields, villages, and the large port of Georgetown. Butterflies here mostly belong to species found in cultivated areas or secondary jungle in this Indo-Malayan Region, though some good ones inhabit the jungle around the Botanic Gardens and Waterfall; I often enjoyed observing and sometimes collecting these at the blossoms in the Gardens, notably at a white-flowered species of *Lantana*. There is still a considerable amount of jungle on the beautiful "Hill," really a hill group, rising to 2700 feet on Western Hill, and here a number of interesting and rare species maintain their existence. But on the whole butterflies are not common in Penang and I was often struck by their scarcity, especially during numerous visits paid to this charming place during thirteen years' residence in Malaya before I concentrated upon the study of Malayan Rhopalocera. They are specially few during the wet season, October to December. Later I got to know something of their general habits and the particular spots to which many uncommon kinds are confined in such a small and largely cultivated area as Penang. Even so, many dull days were experienced as well as good ones, and my captures of several rare species extended only to one or two individuals, though I saw many more of the large, seldom caught *Zeuxidia double-dayi*, especially males, than the three I managed to obtain.

The list given below does not, therefore, pretend to be a complete one; but it may be of interest as a record of one naturalist's results over a period of three years (excluding furlough), especially as European collectors are not likely to be able to study Penang Lepidoptera for some time to come.

Many butterflies common on the Malayan mainland are, apparently, not found in this island, but a total of 168 species shows how rich in them a small station in this region is in comparison with many other parts of the world.

Identifications were made by myself or, in difficult cases, by Capt. H. M. Pendlebury, Director of F.M.S. Museums, or Dr A. S. Corbet of the British Museum (Natural History). I am very grateful for their assistance in this matter. The names given are from their *Butterflies of the Malayan Peninsula* except that in a few cases I have reverted to such familiar generic names as *Euploea* or *Terias*; and a few names of species not listed in that work also appear. Dr Corbet, alone or in conjunction with other taxonomists, has lately published a number of papers in the Proceedings of the R. Entomological Society and other journals in which many new species of Malayan butterflies are described and many others appear under different names. But my specimens were labelled in accordance with the book mentioned, which appeared as recently as 1934, and is based on Seitz' standard work on the *Macrolepidoptera of the World* (Vol. ix). These names are therefore at present more convenient for general reference. Also the re-identification of rare species is difficult when they are kept in papers, which is the safest method for valuable specimens under existing war conditions.

In addition I found Distant's *Rhopalocera Malayana* (1886) a great help, especially its beautifully coloured and executed plates. Distant and his Maecenas, Logan, were both closely connected with Penang, and Distant's were types mostly taken there or on the western part of the Peninsula.

Entomologists who wish to know more about these species can consult the works mentioned. War-time paper exigencies prevent more than short notes on points of special interest in even a one-man list for a station in one of the world's two greatest butterfly regions.

PAPILIONIDAE

1. *Papilio helena*, ssp. *cerberus*, Feld. Very uncommon, though common on Bukit Mertajam Hill 15 miles across the strait.
2. *P. amphrysus*, ssp. *ruficollis*, Btlr. Fairly common at all elevations; males soar in morning, females appear more often later.
3. *P. varuna* (2), White Common around flowers in Bot. Gardens and occurs on Hill; as in several large Paps. females seldom appear till dusk approaches.
4. *P. coön*, ssp. *doubledayi*, Wall. Fairly common, notably Botanic Gardens, 6 p.m., feeding white *Lantana* flrs.
5. *P. aristolochiae*, ssp. *asteris*, Rothsch. Fairly common everywhere.
(*P. paradoxa* group All apparently absent though the alleged "models" are common in Penang and *paradoxa* and *clytia* not rare in Northern Malaya.)
6. *P. demoleus*, ssp. *malayanus*, Wall. Common as throughout Malaya.
7. *P. demolition* (2), Cr. Very rare in Penang; may fly over from Bukit Mertajam? A swift flier.
8. *P. helenus* (2), L. Rare in Penang; others of *helenus* group not seen except :
9. *P. iswara* (2), White This splendid, usually uncommon insect is quite common on Penang Hill above 2000 ft.; fond of ordinary, pink *Lantana* flrs. and visits Hill bungalow gardens.
10. *P. polytes*, ssp. *romulus*, Cr. Fairly common, all elevations; f. *theseus* the commoner female.

11. *P. memnon*, ssp. *agenor*, L. Males common, Hill and Bot. Gdns.; females rarer, ff. *distantianus* usually; *esperis* seen; *butlerianus* prob.
12. *P. antiphates*, ssp. *itamputi*, Btlr. Only one seen; other "swordtails" absent; yet *antiphates* too is fairly common in North Malaya.
13. *P. sarpedon* (2), L. Males moderately common; females rare as elsewhere in Malaya.
(*P. doson* group All apparently absent though many are common on the mainland.)
14. *P. agamemnon* (2), L. Fairly common.
15. *P. leucothoë* (2), Westw. Rare; males appear sometimes along roads in Hill jungle areas.
16. *P. delesserti* (2), Guér. Ditto.
(*Leptocircus* spp. None seen, doubtless do not occur.)

PIERIDAE.

17. *Delias hyparete*, ssp. *metarete*, Btlr. Common in gardens and even in Georgetown streets.
18. *D. aglaia*, ssp. *parthenope*, Wall. Fairly common on Hill above 2300 ft.
19. *D. ninus* (2), Wall. Ditto.
20. *Appias lyncida*, ssp. *vasava*, Fruh. Fairly common, males more so.
21. *A. nero*, ssp. *figulina*, Btlr. Males fairly common; caught the rare female inside a Hill bungalow one day, 4.30 p.m.
22. *A. leis* (*melania*, Seitz), ssp. *dis-*
tanti, Mre. Rare; Hill, 800 ft.
23. *Catopsilia pyranthe* (2), L. Common.
24. *C. crocale* (2), Cr. Common; also the forms often classified as *C. pomona* (2), F.; but these sometimes pair with *crocale* in Malaya and I have numerous intermediates.
25. *C. scylla* (2), L. Common.
26. *Terias drona*, ssp. *senna*, Feld. Penang Hill, above 2200 ft.; the only locality in the world for this species or form.
27. *T. hecabe* (2), L. Common, as everywhere in Malaya.
28. *T. simulatrix*, ssp. *tecMESSA*, Nic. Fairly common.
29. *T. blanda*, ssp. *snelleni*, Mre. Uncommon.
30. *T. sari*, ssp. *sodalis*, Mre. Fairly common.

DANAIDAE.

31. *Danaus chrysippus*, ssp. *margarita*,
Röb. Common.
32. *D. genutia*, ssp. *intermedia*, Mre. Uncommon as elsewhere in Malaya.
33. *D. melanippus*, ssp. *hegesippus*, Cr. Uncommon by my records, and Distant does not mention it for Penang. Other *Danaus* spp. absent except:
34. *D. similis*, ssp. *vulgaris*, Btlr. Common.
35. *Ideopsis gaura*, ssp. *perakana*, Fruh. Common on Hill above 1600 ft.
36. *Hestia lynceus*, ssp. *reinwardti*, Mre. Uncommon; Hill, 2000 ft. +.
37. *H. hypermnestra*, ssp. *lin-teata*, Btlr. Common on Hill from 1700 ft. up, though C. & P. say is rarely found in northern Malaya.
38. *Euploea alcathoë*, ssp. *gardeneri*,
Fruh. Fairly common along jungle paths.
39. *E. mulciber* (2), Cr. Common as in all Malaya; females often alone, jungle or hill tops; males abundant lower.
40. *E. corus*, ssp. *phoebus*, Btlr. Uncommon; large, splendid species: haunts sea coasts, Malaya, at least in north.
41. *E. diocletianus* (2), F. Not common as on mainland.

(To be concluded.)

ECONOMIC VERSUS " AMATEUR " ENTOMOLOGISTS AND A SUGGESTION.

By G. V. HUDSON.

The growing influence of the professional entomologist over and above that of the old style, or " amateur," entomologist, who followed the science purely for the love of it, is becoming more evident every day. This modern development is probably causing some concern to a considerable number of nature lovers who are primarily interested in the recreative, taxonomic, aesthetic and philosophical sides of entomology, now more or less neglected in favour of economics. Those who were quite willing, under the old regime, to give both their time and money to entomological projects must hesitate at times to assist a class of worker who probably draws a substantial salary and whose motive for entomological work may be purely mercenary. That pure entomology as pursued by the older school of entomologists such as Stainton, McLachlan, South, Knaggs, Greene, Doubleday and very many others, has brought great happiness to its countless followers, and done much to elevate humanity, cannot be denied by anyone having a reasonably wide outlook, and this is a big set-off against the much vaunted material attainments of the modern economic entomologist.

It is woefully apparent to those who attempt to follow the course of modern entomology that relatively uninteresting essays which may be classified as " University Theses " or " Departmental Reports " are monopolising much of the space in our magazines, and in the " Transactions " of our entomological societies, and that in supporting these we are assisting the economic school to further influence and power to the detriment of the higher activities referred to above. I have long had this aspect of our science under consideration, and in 1929 I wrote a pamphlet on the subject which was reprinted in full at page 146 of the July issue of the *E.M. Mag.* for that year. 1000 copies of this pamphlet were printed and distributed at my own expense and, as I still have a few copies left, I shall be glad to send a copy on the receipt of a request from any entomologist interested. On this account I will abstain from going into any further details on the present occasion, but I desire to make a practical suggestion. Most of us are aware of the very beautifully illustrated volumes of the Transactions and Proceedings of the Entomological Society of London issued from an early period up till about 1920, when a fundamental change first became evident. In my own case the arrival of these " Transactions " was always eagerly anticipated, the articles and splendid coloured plates being most inspiring and revealing an example of work to be striven after and, if possible, attained. Now all is changed and we are regaled on reports on pests such as meal moths, tsetse flies, and such like. Publications of this nature should certainly be paid for by Government Departments or commercial concerns interested and not by members of a society who have the right to expect articles fully up to the old standard of general interest. Before 1936 the outlook from this standpoint became so bad that I decided, with great regret, to leave the Royal Entomological Society, after 47 years of fellowship, and resigned. It seems to me that the time is now ripe for the establishment of a new ento-

mological society to be run on much the same lines as the old Entomological Society of London with interesting, well illustrated, transactions, such society to specially cater for the "amateur" entomologist who is primarily interested in the recreative, taxonomic, aesthetic and philosophical aspects of the science and that contributions of a definitely economic nature be excluded therefrom. Personally, I would be glad to support such a society to the best of the means at my disposal, and it is possible that a sufficiency of others in the British Empire, and perhaps elsewhere, might be prepared to do the same.

[COMMENT ON THE ABOVE.—I quite agree with most of the above article until the writer comes to "a suggestion" for a remedy. I am totally against deserting the enormous amount of generations of energy, which is symbolized by the financial position accumulated over many years by the amateurs, all of whom were actuated by their intense love of the nature study side of Entomology, "recreative, aesthetic and philosophical" based on "taxonomic" studies of the specialists of the day. No! The return to these aspects of the science will return when our young men come back.

One must, of course, recognize the fact that without the recorded observations made during past ages by the amateur entomologists, our modern economic entomologists simply could not exist. I do not like the slur of the term "mercenary" used by the writer, but, unfortunately, we find that many if not most of the latter are not field workers, take no part in our local societies of nature lovers and are not interested to the slightest degree in the life-problems of the creatures they professionally study.

As the Royal Entomological Society is especially referred to by the author, let us look at the facts. His resignation was presumably finally caused by the volume of the *Transactions* for 1935. I have been carefully through this volume with the preconceived view that its content would fully substantiate his views. But practically each article in this issue "smelt strongly" of its writer's experiences in the wild free open country and was most attractively interesting; scarcely in any article was there evidence of what I have heard called "the results of museum lounging." Of late years coloured plates have been so expensive as to make it practically impossible to use them. Yet in the recent issue of the *Transactions* we have one article with no less than 16 beautifully coloured plates.

Yes, there have been very long reports, pestalogical, economic and medical, published by the Society, but in every case the bulk if not all the cost has been borne by a Government Department, the Royal Society, a University Authority or other outside body, as shown in the yearly financial statements in each case.

As for the suggestion. No! By all means, no! It is utterly impolitic. In the past quarter of a century, under most able treasurers, thousands of pounds have been placed in the hands of the Society by amateurs, as anyone can readily ascertain by the statements published in the final part of the *Proceedings* each year. Is the present generation of members going to abandon such resources? Emphatically no!—HY, J. T.]

COLLECTING NOTES.

RHYSSA PERSUASORIA, L.—I had brought to me in June 1941 a female specimen of *Rhyssa persuasoria*, L., our largest Ichneumon. It had been taken near Penton, and I had not come across it in the area before, although since *Sirex gigas* has been more than common in the woods about the Border for some four years I was expecting the Ichneumon to make its appearance sooner or later. In July the fly was to be had in numbers where woods had been cut down and numerous trunks and branches of firs and other trees were lying on the ground. Except for the first seen, most of the flies were males, but these became more scarce later, when practically all seen were females. I also saw a female specimen when out walking near Langholm in late July.—F. MARRINER.

EUPHYDRIAS AURINIA IN SNOWDONIA, N. WALES.—In the *Entomologist's Record* for October 1940, Vol. lii, No. 10, p. 12, Mr J. Anthony Thompson notes the discovery of a colony of the above in the south of Snowdon range, remarking on its comparatively high altitude and saying that the only other colony is over fifty miles distant from that of Snowdon mountain. It appears, therefore, that he is unaware of the existence of another colony of this species, occurring (I am guessing the figure) at between 600-700 feet not far from Dolgelly. The colony is certainly not on low-lying ground and it is within fifty miles of Snowdonia so that I presume it is not the one referred to by Mr Thompson. I have only seen the insects in worn condition, but I do not remember that they were of any special form. Perhaps Mr Thompson's note refers to the Dolgelly colony; I should hardly consider the district in the Snowdon range however.—P. SIVITER SMITH, Little Ashton Park, Streetly, Staffs.

STRYMON PRUNI AND LARVAE BEATING.—May I emphasize that the proper method of collecting larvae of the above species is by searching and not by beating. Beating the blackthorn bushes on which it feeds does great damage to them as they are brittle and smash most easily. The devastation caused by beating is tremendous in this case. Further, the larvae cling tightly and are frequently damaged by the jarring and if beating is done too late many pupae are destroyed. The species is not common and liberties of this sort should not be taken with it. It sounds laborious, but after finding the first larva by searching it is not difficult to discover them at the same rate as they can be beaten out. I have tried both methods and eventually gave up beating and searched for them entirely with considerable success.—P. SIVITER SMITH.

ARGYNNIS AGLAIA, R. SCOTICA, WATKINS IN THE WESTERN ISLANDS OF SCOTLAND.—In an earlier publication dealing with the Lepidoptera of the Hebrides (*Proceedings of the University of Durham Philosophical Society*, Vol. x, Pt. 1, May 1938) it was stated that the darkest examples of the females of this form were to be found in the Isle of South Rona and on the Lewisian Gneiss area of Raasay. In addition, it was pointed out that, of the islands south of Skye, Soay, and Canna produced the most strongly-marked melanic specimens. Since then we have worked most of the Outer Hebrides and likewise the Coll-Tiree group. As a result, we have discovered little to cause us to revise our judgments

except in the case of the Isle of Pabbay in the Barra Isles. There the var. *scotica* females, although variable, appear in a guise much the same as that presented by South Rona insects.

No one who has only seen cabinet specimens of this race can realize how beautiful and how dark fresh specimens from South Rona and Pabbay can be. Many are actually darker, and of a more attractive black-blue-green, than the *valezina* form of *A. paphia*. Unfortunately, this colouration is not permanent. Now my South Rona (1934) and Raasay (1936) representatives of the race appear but little darker than some of my Northumberland series.—Prof. J. W. HESLOP HARRISON, King's College, University of Durham.

CARSIA PALUDATA, THNBG., IN THE HEBRIDES.—In the Inner Isles this species swarms on *Vaccinium*-clad slopes on South Rona, but thins out in Raasay, where, in fact, it occurs sparingly on the central moorlands. South of Skye, on the Isle of Soay, it flies in great quantities, in company with *Celaena haworthii*, on a restricted area near Loch Doire-an-Lochain in the northern half of the island. In the Outer Isles it may be taken amongst the bilberry colonies on banks bounding the stream issuing from the Coire Dubh on Beinn Mhor, Isle of South Uist.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

THE DATE OF EMERGENCE OF *OPISTHOGRAPTES LUTEOLA* IN THE ISLES OF RHUM, EIGG, AND SOAY.—In August 1937, when we first visited Rhum, we were drawn into Loch Scresort by a fierce gale accompanied by very heavy rain. In spite of this, late as the date was, we were astonished to find examples of the 'Brimstone Moth' flying out of the woodlands near Kinloch. The form was a heavily marked and quite large insect, and we concluded that it was attached to the hawthorns near by. At the same period, a similar insect was emerging on Soay. Although the notion was improbable, we imagined that a possible second brood was indicated. However, the matter was satisfactorily settled later when, in May and June 1941, larvae, half to three-quarters grown, were beaten from hawthorn and mountain ash on the Isle of Rhum. These duly pupated to emerge in July of the same season. The position in Eigg seems different, for, early in August, near Poll-nam-Parton, the hawthorns produced larvae of the same species and later overwintering pupae. Thus the Eigg race seems to have the same life cycle as Durham strains, which uniformly hibernate as pupae. It is hoped to pursue the matter further in certain genetical experiments now in progress.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

VENILIA MACULATA, L.—A SURPRISING FIND IN THE ISLE OF RAASAY.—Near the hamlets of Inverarish and Balachuinn, more especially the former, large areas of woodland may be encountered. Here, broken banks, supporting colonies of the wood sage, are often common, amongst which our parties, working these areas in May and June, discovered *Venilia macularia* flying in some numbers.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

LAOTHOE POPULI IN THE ISLE OF COLL.—Although the "Poplar Hawk Moth" may be taken freely in many localities in the islands forming the Watsonian vice-county 104, until recently it had escaped observation in the Outer Isles (v.-c. 110) and in the Coll-Tiree-Gunna group

(v.-c. 103). However, it may now be recorded from the Isle of Coll, for imagines were captured on aspen near Arinagour, and eggs collected from plants growing in the Loch a' Mhill Aird area of the same island in May and June. Similarly, in August, larvae were beaten from *Salix aurita*, L., on the side of the road between Arinagour and Gallanach. Up to the present time, in spite of careful observations, we have failed to detect it in the Outer Hebrides. Nevertheless, its presence on Coll, which shows great zoogeographical affinities with the Outer group, warrants the hope that, eventually, it may turn up on Barra, Eriskay or South Uist.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

HEODES (LYCAENA) PHLAEAS, VAR. ALBA, IN NORTHUMBERLAND.—A good specimen of this insect was observed on the Seaton Sluice sand dunes in October 1941 on an area where the species occurs freely. Although the insect is usually extremely abundant in these two counties (Durham and Northumberland), it appeared in greater numbers than ever last year. Few of the insects noted showed any noteworthy variation. I have, however, a specimen captured near Birtley, Co. Durham, in which the left lower wing is of the *alba* facies in the outer half, which yields gradually to a more normal colouration toward the base of the wing. Another specimen, captured in the same colony, has a wing expanse of about 1 cm.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

NOTE ON COLIAS CROCEUS, FOURC., IN NORTH HAMPSHIRE.—Although a collector in my youth (50 years ago) I never remember to have seen this butterfly in this district until a few years ago. Since then I have seen occasional specimens on the Downs, always in August or September, and once in my own garden. In August 1940, I captured two, for the first time, in a clover field, both males, in perfect condition. Last year (1941), however, I not only took two more (both males) on 21st and 24th August, but saw 4 or 5 on 28th August, 2 on 29th August pursuing one another, 1 on 30th August, 1 on 3rd September, and 1 on 4th September. All except the last—which was in a clover field near the downs—were in rough pasture, where *Lotus corniculatus* was plentiful. All of these, before mentioned, were apparently 2nd brood, presumably from 1st brood migrants, which I have never seen here. In 1936, however, I saw, while shooting, on stubbly clover, a large quantity, about 3rd or 4th September, which must I think have been immigrants. This parish is 50 miles from the sea, and is I fancy not a favoured locality. It is I think clear from the foregoing, that this species is becoming more so, and that 1941 was a good year here as elsewhere, but not phenomenal. When freshly emerged they are much more easily caught, but in a very short time require an athlete to get on terms. No variety have I seen and, to my knowledge, no female. I was sent one from Sandhurst last August, also a male. Is there any reason for this disparity in sex? They seem to stick to one field very much, and then to move South towards the coast, over the North Downs. I have noticed that, as I have read also somewhere, they are liable to become confused, when struck at with the net, and thus to offer a second chance, which must be quickly taken.—(Capt.) ALBAN. F. L. BACON, M.A., Burghclere, Hants, 8th April 1942.

CURRENT NOTES.

FROM Prof. Bryan P. Beirne we have received a short pamphlet on "Some Lepidopterous Pests on Fruit Trees and their Parasites in Ireland during 1941." It is published by the Royal Dublin Society. It will no doubt be found to be a very useful guide for future observation and report.

A SEPARATE of the *Proc. U.S. Nat. Mus.* has reached us entitled "Notes on some N. American and Middle American Danaid Butterflies." It is mainly occupied with a consideration of the wrongly named *Danaus plexippus* and the group of forms or species associated with it in the area. Unfortunately, it only opens the subject and does not take in the Central and S. American forms and show the whole relationship. Those included in the area are *D. plexippus*, L. (?), *D. megalippe*, Hb., *D. berenice*, f. *strigosa*, *D. erisimus*, *D. cleothera*, Gdt., and *D. jamaicensis*, Bates. There are also considered *D. tobagi*, n. ssp., *D. portoricensis*, n. ssp., and a new species, *D. candidus*, n.s., from Peru. We hope the author will continue and complete the revision of the whole group. There are four excellent plates including figures of the new forms.

LOVERS of Nature in its free and open aspects will doubtless welcome the reappearance of the magazine *Country-side*, which has ceased appearing for the past two years. It is appearing in a smaller size, four times a year, and will be welcomed by many members of the old association of general naturalists known as the B.E.N.A. It will keep the cause going.

IN the American *Ent. News* for January is an interesting note on the association of a Noctuid moth, *Camptylorchila (Epizeuxis) americalis*, Gn., with the ant *Formica rufa*, ssp. *obscuripes*, Forel. The moths with closed wings were observed to crawl into entrances to the ant mounds quite freely without any attention from the ants.

THE *Canadian Entomologist* for January is unusually interesting. There are descriptions of two new Rhopalocera forms, one a *Strymon* (Lycaenid) bred from larvae on hickory: *S. caryaevorus*, Mc. D., from Ontario, the other a *Coenonympha*, *C. ampelos*, race *mona*, Burdick, from the Mona Basin of California. The latter is figured. The account of a tick, *Ixodes californica*, which had recently become very abundant in West Vancouver. The larval and nymphal stages feed on a very abundant ground lizard, as many as 103 having been picked from a single lizard. Eggs are laid on the ground, hatch, and the larvae climb the low vegetation, and soon get transferred to dogs especially, cats, cattle, goats, sheep and humans. So far as is known it is as yet only a potential carrier of disease. There are illustrations and full descriptions of two Noctuid larvae not hitherto known, feeding respectively on rotten pine and spruce. "A Synopsis of the genus *Anoncia* of the *Cosmopterygidae*" including a new species. An account of the Anopheline Mosquitoes from S. Ontario including the dreaded *A. quadrimaculatus* and a few short notes complete a really good number.

WE regret to see how the term "hermaphrodite" is being wrongly used recently. In a book published a year or two ago we read a meaning of the word "in which the same specimen has one half entirely male and the other half entirely female." Such a specimen is simply an equally divided "gynandromorph." A true hermaphrodite must be a being of two sexes each part capable of doing its function in reproduction. Does any one know of such among the Lepidoptera? I understand that among the toads there are really true hermaphrodites. Historically the term was used in last century (e.g. Geddes & Thomson's *Evolution of Sex*, 1898) to cover all cases of gynandromorphism. But it has gradually been limited to the original meaning of the word in its original Grecian association. Thus there are so far as known at present no hermaphrodite in the Lepidoptera.

WE have just received five further separates from our correspondent, K. J. Hayward, in the Argentine, four of them dealing with his special work in the Estacion Experimental Agricola de Tucuman and one with his favourite Family of the Lepidoptera, the *Hesperiidae*. In a well-illustrated booklet he deals with the very troublesome Coccid pests which do much damage to the *Citrus* trees and fruit, giving their life-history and the methods used to control them. Another pamphlet contains an account of the Noctuid *Cydia* (*Laspeyresia*) *molesta*, Busch. In another booklet Hayward has collected together short details of all the Insects of Economic Importance in the region of Concordia (Entre Rios). His contribution to the knowledge of the *Hesperiidae* is a List of the Food-plants upon which this Family feed in the Argentine; nearly 40 species are listed, with reference to the records in each case.

THE Publications of the Royal Entomological Society for the past year has again been astonishing in its amount and comprehensiveness. When the Annual Report of the Council, President's Address, Treasurer's Report, List of Members, etc., are published the issue of nearly 1200 pp., 44 plts. (19 coloured), nearly 800 figures, including maps, will be another record. Just as in 1940 when there was an outstanding paper by Dr Verity on the *Athalia* group of the *Melitaea* abundantly illustrated, so this year we have another outstanding feature in the paper by Dr Higgins on another group of the *Melitaea*, the *didyma* group, illustrated with 16 plates of coloured figures, nearly 200 in number, and over 200 figures in addition. In fact, this production appears to be everything that a paper of this description should be. But we cannot detail it in a short notice such as this. Quite half the 13 papers in the *Transactions* give no illustrations of the insects they deal with, although abundance of figures of parts more or less microscopical, and in no way interest the true nature lover and can be appreciated only by the few or very few intensive working students. It should be the aim of all writers of articles, besides giving information on their work, to attract others to observe the objects of their study and to add to the matter for the further continuance of such studies.

the other hand Seitz may have put an *ocellaris* form in his *gilvago* abs. Had he bred the species he could have been in no doubt. The larvae are very different."

The Names and Forms to be considered are:—

ocellaris, Bork. (1792), *Naturg.*, IV, 647.

gilvago, Hb. (1800-3), *Samml. Noct.*, 193, a synonym.

f. *lineago*, Gn. (1852), *Noct.*, V, 396.

ab. *intermedia*, Habich. (1895), *Jahrb. Wien Ent.*, VI, 491, plt. 1, fig. 5.

ab. *carneago*, Warr.-Stz. (1911), *Pal. Noct.*, III, 155, plt. 28i.

ab. *gilvescens*, Wrsly.-Wd. (1915), *E.M.M.*, LI, 186, plt. 1, f. 6.

ab. *punctata*, Heinr. (1916), *Deutsch. ent. Zeits.*, p. 521.

ab. *lineago*, Gn., *Noct.* I (V), 396 (1852).

ORIG. DESCRIP.—"Entirely powdered with grey atoms, with the nervures and median lines bright; the spots (stigmata ?) well developed and encircled with lighter; a white point slightly encircled with blackish in the base of the reniform. Subterminal line almost lost in the ground colour. The figure of Hübner gives a wrong idea."

In Culot's figure of ab. *lineago* (plt. 56, 1) the characteristic submarginal band is well depicted and it can also be very faintly seen in the ab. *palleago* (plt. 56, 2) figured by Culot, although all markings are almost obsolete. Culot referred his ab. *palleago* to Hb. f. 442, but the two figures are widely divergent, and in my opinion Hb. 442 is not an *ocellaris* form as Culot said. It may be that figures in copies of Hb. differ, but not in essential features and colour; Hb. 442 has a dusky costa, blackish surround to the stigmata, submarginal band not defined, non falcate wings, colour and texture not those of *ocellaris*, etc.

Hamp., *Cat. Lep. Ph.*, VI, 505 (1906), "Head, thorax, and forewing more suffused with grey-brown."

ab. *intermedia*, Habich., *Jahrb. Wien Ent. Ver.*, VI, 49 (1895).

Fig.—l.c., plt. 1, f. 5.

DESCRIP.—Transitional between typical *ocellaris* and *gilvago*. Warren said: "It may be, I think, the same as the yellower form of *palleago*, Hb. f. 442."

Some older authors mixed this species hopelessly with *gilvago*, e.g., Treitske and Herrich-Schaeffer.

DESCRIP.—Neither Warren nor Draudt seem to definitely recognize this form. Warren-Seitz, *Pal. Noct.*, III, 155 (1910), said "it is said to be transitional between typical *ocellaris* and *gilvago*; it may be, I think, the same as the yellowish form of *palleago*, Hb. f. 442." Draudt said (*Pal. Noct. Supp.*, 154 (1934)) "is the form that is so often wrongly diagnosed, with pale ochreous to olive-grey ground colour with bluish-grey spots and bands, whereby in many specimens a striking resemblance is created to certain *gilvago* forms. The *ocellaris* forms are, however, generally easily recognizable by the more protracted and falcate apex of forewings."

The features of the two species, as I understand them, preclude the production of intermediate forms except in the absence (absolute) of all trace of marking and in *ocellaris* of surface texture.

ab. *carneago*, Warr.-Stz., *Pal. Noct.*, III, 155 (1911).

FIG.—*l.c.*, plt. 28i.

ORIG. DESCRIP.—“Is pink, only the basal and terminal areas faintly greyish, the markings very faint, and the fringe pink.”

ab. *gilvescens*, Wrsly.-Wd., *E.M.M.*, LI, 186 (1915).

FIG.—*l.c.*, plt. , f. 6.

ORIG. DESCRIPTION.—“As in *intermedia*, but with pale buff ground colour, and with the stigmata faintly indicated, the pale inner circumscription absent, and the outer dark line frequently incomplete. Thorax greyish yellow with dark crest.” Bred. Thames Valley.

ab. *punctata*, Heinr., *Deutsch. Ent. Zeits.* (1916), p. 521.

ORIG. DESCRIP.—“This form has a dark brown row of spots standing out clearly on the inner margin of the waved line, which Berge-Rebel has given as a characteristic of *gilvago*, Esp. But the form shows clearly the white spot characteristic of *ocellaris* at the lower end of the reniform.” Lichtenrade near Berlin.

Cirrhoedia, Gn. (1852), Dup., H.-S., Gn., Barr., Stdgr., Sth., Splr., Culot. [*Xanthia*, Ochs. & Tr. (1816-25), Curtis: *Orthosia*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Atethmia*, Hb. (1821), Hamp., (Sth.), Warr.-Stz., Drdt.-Stz.] *xerampelina*, Hb. (1808).

This species was described as a new species under the name *centrago* by Haw., *Lep. Brit.*, 236 (1809), but he pointed out its similarity to the *xerampelina* of Hb.

Tutt, *Brit. Noct.*, III, 15 (1892): Meyr., *Handb.*, 60 (1895): Barr., *Lep. Br. Is.*, V, 357, plt. 229, 3 (1899): Stdgr., *Cat.*, IIed., 116 (1871), and *l.c.*, IIIed., 205 (1901): Hamp., *Lep. Phal.*, VI, 494, fig. 166 (1906): Splr., *Schm. Eur.*, I, 247, plt. 46, 3 (1907): South, *M.B.I.*, II, 10, plt. 4, 5-9 (1908): Warr.-Stz., *Pal. Noct.*, III, 153, plt. 36 f (1910): Culot, *Noct. et G.*, I (2), 76, plt. 53, f. 2-3 (1914): Meyr., *Rev. H.*, 120 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 152, plt. 19 a, b (1934).

Goedart in his *Metamorphosis naturalis*, Vol. III, plt. 43 (1669), figured the larva, pupa and imago on a rose bush, which have been determined as *xerampelina*. (See Werneburg, *Beitr.*, I, 43 (1864).)

Esp., *Abbild.*, IV, *Noct.*, II (2), b, p, 15, plt. 183, 5 (1792+?), may or may not be *xerampelina*. Werneburg said it was *ambusta*, Schiff.

Hb.-G., *Samml. Noct.*, 421 (1808), gave an excellent figure; *l.c.*, 858 (1834), of a very small, starved example.

Curtis, *Brit. Ent.*, 84 (1825), gave an excellent figure of a British *centrago* and gave details of Haworth's new species with a similarity to *xerampelina*, Hb.

Dup., *Hist. Nat.*, VII (1), 249, plt. 116, 1 (1827), gave a very good figure. *Cirrhoedia*, Gn. (1846).

Freyer, *Neu. Beitr.*, II, 93, plt. 149, f. 2 (1836), described this species as a “great variety” and gave, as Hb. had given, 421, an undersized figure “rather hard in marking, “the transverse lines being very stiff. The thorax and forewings are pale red-yellow, the central area as well

as the marginal area with the cilia much darker with a purplish suffusion. The reniform is a rust-yellow, but there is no trace of the other two stigmata. The hindwings are pale isabel colour. Underside whitish-yellow, dark powdering near the fringes."

H.-S., *Sys. Bearb. Noct.*, II, 225 (1849), said, "I have seen no example so large and so variegated" as Hb. 421. The marginal area does not reach vein 4. Hb.-Gyr., 858, seems a ♀ remarkable for the two sharp teeth tending marginally and to the apex of the extended waved line, from which it is darker up to the edge of the ground colour. He said that Wood's fig. 349 was not good. *Cirrhoedia*.

Gn., *Hist. Nat. Noct.*, V, 402 (1852), included *centrago*, Haw., and described as var. A a unicolorous form which Stdgr. named *unicolor*, *Cat.*, IIed. (1871). *Cirrhoedia*.

Millière, *Icones*, pt. VII, plt. 33, fig. 4-7 (1862), gave a good figure somewhat small of a banded form, together with larva and pupa on rose.

South, *M.B.I.*, II, 10, plt. 4, 8-9 (1908), gave two fairly good figures. Fig. 8, the ordinary orange-yellow form, with a purplish red central band, ab. *centrago*, Haw.; 9 is ab. *unicolor*, Stdgr.

Splr., *Schm. Eur.*, I, 247, plt. 46, 3 (1906), gave a better figure than most on the plate, but the forewing too rounded, apex much too blunt, hindwing too red-brown, instead of being yellowish to near the margin. He recognized ab. *unicolor*, Stdgr., ab. *pallida*, Stdgr., and ab. *maculifera*, Stdgr. *Cirrhoedia*.

Warr.-Stz., *Pal. Noct.*, III, 153, plt. 38 f (1910), treated *centrago*, Haw., as a synonym. He gave two good figures; typical and ab. *unicolor*, Stdgr., 38 f. In addition he recognized a pale form, *pallida*, Stdgr., from Asia Minor, and a paler yellower form, *maculifera*, Stdgr., from Syria. *Atethmia*.

Culot, *N. et G.*, I (2), 76, plt. 53, f. 2-3 (1914), gave two very good figures. 2, a typical form of a beautiful shade of yellow and an incomplete central fascia. 3, ab. *unicolor*, Stdgr., almost entirely of uniform reddish ochraceous ground colour. *Cirrhoedia*.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 152, plt. 19 a, b (1934), gave five newly described forms, with a better figure of the typical form than in the main volume, a figure of ab. *flava*, which is certainly ab. *pallida*, one of ab. *maculifera*, which is larger and has a comparatively huge discoidal spot and is equally pale, and five of the ab. *pallida* forms of different shades of pale ground colour.

Barrett said of the Variation:—

Variation in this species is usually in the degree of incompleteness of the central band. Very often this is entirely cut off from the costa by the yellow ground colour, the second line is complete and the rest of the band so cut off; or even occasionally both lines are complete and yet the costal region of the band is yellow in varying degrees. He said, "In a rare variety the band is complete from margin to margin."

In another, "the complete purple or purple-red band is supplemented by similar colouring over the whole basal and submarginal regions, a narrow line of yellow, bordering the first and second lines being the only trace of the usual ground colour. This is var. *unicolor*, Gn."

Mr Whiteman has had a considerable experience with the breeding of this species and states that the colour is so delicate that captured and

old specimens do not give a true appearance of the colour. Of these bred examples he has kindly furnished me with the following analysis:—

- A. Central band broken up.
 - a. Ground colour pale yellow: marking purple-grey.
 - b. Ground colour pale orange, tinted yellow: marking pale dull red.
 - c. Ground colour pale orange-yellow: marking deep rich red.
- B. Central band solid to reniform stigmata.
 - d. Ground colour pale primrose: marking purple-grey.
 - e. Ground colour pale orange, tinted yellow: marking in some shade of red.
 - f. Ground colour pale saffron: marking purplish-slate.
 - g. Ground colour smoky saffron-yellow: marking dull purple.
- C. Central band reaches costa: only slight suffusion of outer area.
 - h. Ground colour dull pale orange: marking red-brown.
 - i. Ground colour smoky-saffron: marking purplish-black.
 - j. Ground colour dull buff: marking dull grey.
- D. Outer area much suffused, with band-colour scales. Only basal area still pale.
 - k. Ground colour yellow: marking dull brick-red.
 - l. Ground colour pale orange: marking terra-cotta-red.
 - m. Ground colour smoky-yellow: marking brownish-orange.
- E. Unicolorous except for fine yellow lines bordering the central fascia which is slightly deeper in tone than inner and outer areas.
 - n. Dull greyish-buff.
 - o. Terra-cotta-red.
 - p. Dull purple-red.
 - q. Yellowish-slate.
- F. Unicolorous except for slate-grey marking in the area of the bands due to deep slate-colour veins in these areas.
 - r. Deep reddish-orange.
 - s. Terra-cotta-red.

The Names and Forms to be considered:—

- [*xerampelina*, Esp. (1792-?), *Abbild.*, IV, II (2), b. 15, plt. 183, 5.
- xerampelina*, Hb. (1808), *Samml. Noct.*, f. 421.
- f. *centrago*, Haw. (1809), *Lep. Brit.*, 236.
- ab. *unicolor*, Stdgr. (1871), *Cat.*, IIed., 116.
- ab. *obscura*, Cockl. (1883) (1889), *Ent.*, XVI, 236; *l.c.*, XXII, 55.
- ab. *pallida*, Stdgr. (1891), *Iris*, IV, 299.
- ab. *maculifera*, Stdgr. (1891), *l.c.*
- r. [*rufescens*, n.r. (1941)] 1915, Hoff.-Klos., *Schm. Stierm.*, III, 145.
- ab. *nigropicta*, Schwd. (1921), *Verh. z.-b. Wien*, LXXI, 156.
- ab. *lutea*, Bromb. (1931), *Int. Ent. Zts.*, XXV, 144, f. 1-2.
- ab. *flava*, Rbl. (1933), *Zts. Oestr. Ent. Ver.*, XVIII, 24.

Tutt dealt with (1) the pale yellow typical form of Hb. 421; (2) the orange with red-brown bar, the *centrago*, Haw., an intermediate form; (3) the *unicolor*, Stdgr., of a uniform carnation-red; (4) the *obscura*, Ckrl., which Tutt said is the *unicolor*, Stdgr.

(ab. *obscura*, Cockl.), *Ent.*, XXII, 55 (1889).

Described and not named. Meldrum, *Ent.*, XVI, 236 (1883).

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NYSSIA ZONARIA AND AGROTIS ASHWORTHII IN N. WALES,
APRIL 1940.

13,820

By A. J. L. BOWES.

JUN 15 1942

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I was lucky enough to be able to spend a few days at Conway in the Spring of 1940, from 19th to 25th April, to tackle two insects which I had not met before, and to enjoy some crisp weather among the hills. It is a trip which still lies open to anyone in war time, uncrabbed by the blackout: and I take that as my excuse for putting pen to paper.

I was mainly concerned with two insects, *zonaria* and *ashworthii*. Of these, the first demands nothing more than good timing and pill-boxes, while the second is a less forthcoming creature, and not only has its years, but lives in less accessible places. Even so, my considered opinion is that it is always there, and requires only patience and persistence and agility for its discovery each year.

First of all, *zonaria*. In normal years, I imagine, *zonaria* is at its best in the first week of April. But the Spring of 1940 dawned cold and rather late, and my visit came just after the peak of the emergence (12th April), both males and females being well out. When I left, numbers were falling rapidly, and there were few fresh males to be found. Though this species lives on most parts of Conway Golf Course, they are sluggish and most hard to find where the vegetation is longest; but there is on the S.E. corner of the course a belt of short grass and very low plants lying between the golf course proper and the sea-beach. On this belt the insect was both commonest and easiest to find. Both sexes sat on the sand rather than on the grass, but I could not determine whether they preferred this position or were trying to get away from the thin drizzle that fell on the evenings when I was there. Males and females usually sat close together, sometimes paired, and the profusion was astonishing: I have never before seen odd wings, legs, heads, and dry husks of bodies littering a breeding-ground in such numbers. Here and there females were busy with their domestic duties, stuffing their eggs into any odd cranny that offered, the favourite places being in old twisted pods of vetch, under the dry sheathing leaf of grasses, inside old ragwort stems, and even in the folds of a Players box. Since in peacetime cars drive on to the short grass in dozens, the colony's survival is remarkable, and it is good to have so strong an outpost within fairly easy reach of Southern England. Though I watched the insect for long periods on three separate evenings, I saw no sign of flight or of preparation to fly.

Ashworthii took up my mornings and afternoons, from about 10 a.m. to 4 p.m.; and my main hunting ground was at the top of the Sychnant Pass, on either side of the cart track which turns off to the right just over the brow of the hill as you come from Conway. I chose this spot because it was not too precipitous, had a pleasant aspect and stowage for a bicycle, and involved less cycling and walking than any other: and I don't suggest that it is by any means the best locality, though it did produce more larvae per hour than the other hills we tried. With no previous coaching, it was some time before I began to find the larvae, and in a couple of hours found six, which then slipped in their box from my pocket while I was climbing a rock and bounced down the moun-

tain to perdition. Sandwiches and ale improved my temper, and I started again, this time working the steeper parts and leaving the flat heather of the hillside which had been unproductive; and during the next few days I found that isolated plants of heather peeping out from rocks were far the most fruitful. Three different methods were tried, all of them about equally successful.

(a) A search of the surface of heather clumps. The most difficult but the most placid and therefore to me the most delectable of the three. One just looked at a clump, steadily, and if nothing caught the eye, one passed on. But often only the brown head of the larva showed, and it was as well not to hurry.

(b) Beating into a net. Practicable only on a good foothold, and with a clump which stands out from the cliff-face. As most plants are in niches and a net will not fit into corners, many larvae fall outside and are lost.

(c) A search underneath plants. Used where the heather lies fairly flat on a ledge. Immediate traces are apparent of any larva feeding in the plant,—frass, nibbled heather tips, and so on. Quite often the worm itself would be found lying on the ledge beneath the plant; if not, a gentle shake or a parting of the twigs would reveal it, and very seldom would a clump showing traces of occupation not have a lodger. I think it is rare for a larva of this species to desert a plant once it has adopted it.

A combination of (a) with either (b) or (c) was the most profitable and thorough method that I found possible.

The weather was fine and fairly warm (by midday) on five of the six days, but cold and damp and misty on the sixth with low cloud blowing across the hills. Differences of humidity and temperature seemed to have little effect on the habits of the larvae, which sat up in full view no less readily when at 10 a.m. they were covered in drops of water than when the full sun warmed them in the early afternoon.

Larvae were found in other parts of the Pass also; and on the Jubilee Drive above Penmaenmawr village several came to light, though we did not stay long on that particular hillside; which is hard to work and catches every wind that blows. Most of the larvae were found on or under heather, but we found them eating foxglove, woodsage, gorse, and grass. Quite a large number were crawling merrily over the spines of gorse, and presented a nasty problem to my eager fingers.

My family lived and travelled (by rail) quite happily in large biscuit tins stuffed with heather shoots, and none died on the journey to Kent. Once home, they were transferred to a large cage, floored with a few inches of fibre and growing heather, interspersed with sallow in water. On friends' recommendation I tried dandelion flowers as an appetizer, and found them excellent, given regularly but sparingly for fear of diarrhoea. There were pupation failures, due not so much to overcrowding as to a tendency to pupate in a cluster. Apart from that, I had no difficulty with them, and two of every three emerged successfully in the second and third weeks of June.

Finally, I would like to thank the Frasers of Freshfield and Mr and Mrs Austin Richardson, whose help and gay company made a good week perfect.

R.A.F., Pershore, January 1942.

SOME CURIOUS ENTOMOLOGICAL DRAWINGS.

By FRANCIS J. GRIFFIN.

The Note by "S.G.C.R." in the February 1942 number of the *Entomologist's Record*, p. (9), describing a cartoon entitled "The Entomologist," solves a problem which has troubled me for a long time. In November 1940 the Honourable Miriam Rothschild presented to the Royal Entomological Society of London an original painting entitled "The Entomologist," which agrees closely with the description of the cartoon mentioned above. It is a charming picture and all that was known regarding its history was that it had been a valued possession of the late N. C. Rothschild, a great benefactor to the Society.

Some enquiries were made at the time of the presentation but no information was forthcoming and the picture was framed and hung on the wall of the Society's house leaving the matter of its past history and origin till "after the war." It was difficult even to hazard a guess as to the age of the drawing for it is so remarkably fresh as to appear newly painted.

There are some variations from the description given in the *Record* and these are detailed here. The larva used to indicate the left arm is not "red and black" but yellow and grey with black lines. The right knee seems to me to represent part of a moth, not a beetle. The "nondescript fly" of the left thigh and knee is possibly a winged ant or a termite and the "portion below these limbs . . . formed by the black yellow-banded bodies of Hymenoptera simulating banded stockings and swathed in flimsy wings" appears in the Society's drawing as two similar flying insects. The figure is shown standing on a small patch of ground with a few tufts of grass.

I cannot say whether this is the original drawing from which the engraving published in 1830 by C. Tilt was made but it is at least possible that it is. I think it unlikely, however, since the drawing is so very clean and fresh. I can find no artist's name. I might add that the insect catchers in the left hand of the "Entomologist" have just caught a small blue butterfly.

The opportunity to mention some other interesting entomological illustrations is too good to miss and I give a short description of some now owned by the Royal Entomological Society.

The "Passaliden-Club" is a coloured lithograph so named and drawn by Th. Compton and lithographed by W. A. Meijn. This copy was given me some years ago in Berlin by the late Dr Walther Horn, an Honorary Fellow of the Society. I know nothing of the print beyond what was told me by Dr Hugh Scott, F.R.S., who discovered that it was engraved about 1860 and was drawn by the illustrator of Kaup's monograph of the PASSALIDAE. The scene is the billiard room of a club. Ten Passalid "Members" are shown engaged in various pastimes common to such places. One is taking a shot at billiards while another is emptying the balls from the pockets of the table. Two are just removing their handkerchiefs from their tail pockets, under the elytra, another is leaning against a table reading a newspaper. One "member" is putting on his top-hat on leaving the Club and a very large "member" is busy brushing the back of a diminutive colleague. Or is it the Porter that is so large?

An amusing painting by Charles Oberthur came into the Society's possession some years ago from Miss Rowland Brown, via Sir Edward Poulton, F.R.S., the Honorary Life President. The picture, which is in water colour, depicts a scene in Corsica (?) where an Entomologist, complete with his wife, three daughters, and collecting net, has been captured by a bandit. The very alarmed governess has fallen to the ground but her plight is nothing compared with the other member of the party who, perhaps fortunately, is depicted in the distance. This unfortunate is shown stripped of his trousers and on his knees, dressed in nothing more than a shirt. He is threatened by a bandit armed with a terrifying blunderbuss. Four more bandits are present, one holding the two mules, another searching the trousers, and two supporting the chief bandit who is bargaining with the Entomologist.

VANESSA (PYRAMEIS) ATALANTA IN WINTER.

By H. W. HEAD.

I was much interested in Mr Wightman's note on "*P. atalanta* Emerging in December." This fact tends to bear out my statement published in *The Entomologist*, vol. lxxv, November 1932, in which I said: "I am of the opinion that in the south of England during a fine Autumn there is sometimes a late second brood."

In *The Entomologist's Record*, February 1907, when I first suggested that *P. atalanta* did not hibernate, the bulk of opinion was against my suggestion; but the late Mr Tutt seemed to hold the matter in suspended judgment.

Since then, there has been much controversy on this subject. Many have come round to my way of thinking, but a few still stick to the old theory that *P. atalanta* hibernates; yet there has never been one single proof of *P. atalanta* hibernating in the true sense of the word.

Because they have been seen to fly, and creep into dark parts of Ivy, Yew and other evergreen trees and have been found hiding in dark corners of stone walls, buildings, caves, outhouses, etc., is no proof that they are hibernating. If those who have found them in such places had not disturbed them, and had kept them under observation all the winter to see what happened, as I have done, I think they would have been convinced that they do not really hibernate.

Of those that I have kept under observation, all have died within eight weeks if the temperature during that period never rose high enough to restore their vitality sufficiently for them to come out to take food or water. As Mr Wightman supposes, it is likely enough that there would be a few others emerge, both before and after the date of the specimen he noticed, because *P. atalanta* larvae never all feed up in the same time from one brood; but the severe weather of January may have killed off the remaining pupae or made them too weak to emerge.

From my experience, Mr Wightman's specimen would live from four to six weeks without even flying or taking food; or if brought into a moderate temperature and fed occasionally might have lived until May, if a female, or March if a male. Had January been a milder month

with odd days of sunshine, that specimen, if it escaped an unnatural end, would have been on the wing. It might perhaps have been seen by some collector and noted as a "hibernated" specimen, as so many have been.

I have long been convinced that all the specimens seen on the wing in December, January, and February are late emergences from Autumn broods; and those seen in March and April most likely are immigrants from the Scilly or Channel Islands or some other habitat, where they are on the wing throughout the winter months.

BUTTERFLIES OF PENANG ISLAND.

By L. RICHMOND WHEELER, Ph.D., M.Sc. (Lond.), F.L.S.

(Concluded from p. 41.)

SATYRIDAE.

- | | |
|---|--|
| 42. <i>Ypthima huebneri</i> (2), Kirby | Common. |
| 43. <i>Y. baldus</i> , ssp. <i>newboldi</i> , Dist. | Fairly common. |
| 44. <i>Y. pandocus</i> , ssp. <i>corticaria</i> , Btlr. | V. common as throughout Malaya. |
| 45. <i>Lethe europa</i> (2), F. | Uncommon; appears mostly at dusk. |
| 46. <i>Mycalopsis janardana</i> , ssp. <i>sagittigera</i> , Fruh. | Common in jungle, especially on Hill. |
| 47. <i>M. mineus</i> , ssp. <i>macromalayanus</i> , Fruh. | Common; very variable. |
| 48. <i>M. visala</i> , ssp. <i>khasia</i> , Evans | Uncommon. |
| 49. <i>M. fuscum</i> (2), Feld. | Not uncommon, in jungle. |
| 50. <i>Orsotriaena medus</i> (2), F. | Common, especially up the Hill. |
| 51. <i>Ragadia crisia</i> , ssp. <i>siponta</i> , Hew. | On Hill; uncommon. |
| 52. <i>Melanitis leda</i> , ssp. <i>ismene</i> , Cr. ... | Uncommon; jungle on Hill. |
| 53. <i>Elymnias panthera</i> (2), F. | Rare; jungle, Hill, 2500 ft. |
| 54. <i>E. hypermnestra</i> , ssp. <i>beatrice</i> , Fruh., and <i>f-tinctoria</i> , Mre. | Uncommon;
One dark, intermediate female in Bot. Gdns., 13.2.38 (usually only in "Kedawi" (north) area). |

AMATHUSIIDAE.

- | | |
|--|---|
| 55. <i>Faunis</i> (= <i>Clerome</i>) <i>arcesilaus</i> (2), F. | Often in jungle about 600 ft. above Waterfall; rare elsewhere. |
| 56. <i>Amathusia phidippus</i> , ssp. <i>cherias</i> , Fruh. | Fairly common in jungle; also often in houses, even in town, especially in December. Three taken in 8 days in my hotel, Jan. 1938. Normally flies dusk and dawn. |
| 57. <i>Zeuxidia doubledayi</i> , ssp. <i>cheronesia</i> , Fruh. | On Hill, usually from 1700 ft. upwards; rarely seen except January-March; swift, jungle dwelling, rare everywhere and seldom captured. Normally only seen dusk and after dawn. Males with lovely purple to violet sheen. Females may be taken at fruit bait, otherwise seldom seen close. |

NYMPHALIDAE.

- | | |
|---|---|
| 58. <i>Cupha erymanthis</i> , ssp. <i>lotis</i> , Sulz. | Very common. |
| 59. <i>Issoria sinha</i> , ssp. <i>macromalayana</i> , Fruh. | Penang Hill, chiefly on summits of Tiger and Western Hills. |

60. *Cirrochroa emalea*, ssp. *martini*, Fruh. Hill and Town; but not common.
 61. *C. orissa*, Feld. Very common, mostly in jungle.
 62. *Terinos terpander*, ssp. *robertsia*, Btlr. Hill, jungle.
 63. *Cethosia methypsea* (2), Btlr. Fairly common on Hill; one of its most showy butterflies.
 64. *Precis iphita*, ssp. *horsfieldi*, Mre. Fairly common, all elevations.
 65. *P. allites* (2), L. Common, as elsewhere in Malaya.
 66. *P. almana*, ssp. *javana*, Feld. Fairly common, gardens, lawns, etc.
 67. *P. lemonias* (2), L. Fairly common; open places.
 68. *P. orithya*, ssp. *wallacei*, Dist. Common; lawns, gardens, etc.; males blue h.w. above—v. pretty; females brown above. Sexes similar in others of this genus.
 69. *Hypolimnias bolina*, ssp. *incommoda*, Btlr. Hill; rare.
 70. *Doleschallia bisaltide*, ssp. *pratipa*, Feld. Hill, jungle, and sometimes sunning itself on paths like *Issoria*.
 71. *Chersonesia rahria* (2), Mre. Rare; in Distant's list, 1886.
 72. *Neptis hylas*, ssp. *mamaja*, Btlr. Common, as everywhere in Malaya.
 73. *N. nata*, ssp. *cresina*, Fruh. Common on Hill from 400 ft. up.
 74. *N. miah*, ssp. *sarchoa*, Fruh. Rare and difficult to capture.
 75. *Pantoporia abiasa*, ssp. *clerica*, Btlr. Rare; Tiger Hill, 2500 ft.
 76. *P. nefte*, ssp. *subrata*, Mre. Uncommon; Hill above 2500 ft.
 77. *Liminitis procris*, ssp. *milonia*, Fruh. Not uncommon, especially on sandbanks, Botanic Gdns. stream.
 78. *Tanaecia pelea* (2), F. Common all altitudes in or near jungle; v. like *E. monina* (2), F.
 79. *Euthalia godarti*, ssp. *asoka*, Feld. Hill, 2500 ft.; rare.
 80. *E. monina* (2), F. Common all altitudes nr. jungle.
 81. *E. dirtea* (2), F. Common on shady paths in Hill jungle, mostly above 1000 ft.; feeds much on fallen fruits.
 82. *Eulaceura osteria*, ssp. *kumana*, Fruh. Hill, jungle; very rare.
 83. *Euripus halitherses*, ssp. *pfeifferae*, Feld. Hill; males uncommon; females very rare everywhere in N. Malaya.
 84. *Eriboea schreiberi*, ssp. *tisamenus*, Fruh. One hindwing found nr. Vale of Tempe on ground; insect probably seen once on Hill, 2600 ft. Loose wings of this very rare species have also been found in Singapore—*B'flies of the M. Peninsula*.

ERYCINIDAE.

85. *Abisara kausambi* (2), Feld. Uncommon; near or in jungle.
 86. *A. kausambioides* (2), Nic. Rare; ditto, but 2000 ft. up.
 87. *A. savitri* (2), Feld. Rare; ditto, or edges of tracks on Hill 1600 ft. and more; shy and hard to catch.

(No other Erycinids ever seen in Penang by me; and not one species mentioned by Distant for Penang!)

LYCAENIDAE.

GERYDINAE.

88. *Allotinus subviolaceus*, ssp. *alkamah*, Dist. V. rare; one taken on Hill, c. 2000 ft.
 89. *A. posidion*, ssp. *myriandus*, Fruh. Common in and near jungle.
 90. *A. horsfieldi*, ssp. *continentalis*, Fruh. Ditto.

91. *Gerydus gigantes*, Nic. V. rare; took two together, Hill, 1500 ft.
 92. *G. sp. prob. biggsi* (2), Dist. V. rare; one on Hill, c. 2200 ft.

LYCAENINAE.

93. *Lycaenopsis puspa*, ssp. *lambl*,
 Dist. (= *Celastrina*) Fairly common, Hill, 1500 ft. +. No
 other *L. (C.)* species here.
 94. *Pithecopa zalmora*, ssp. *horsfieldi*,
 Dist. Western Hill, 2400 ft. and over; some-
 times common there.
 95. *Spalgis epius*, ssp. *nubilis*, Mre. ... Penang Hill; uncommon.
 96. *Castalius rosimon* (2), F. Not common; taken on Rifle Range.
 97. *C. elna*, ssp. *elvira*, Fruh. Bot. Gdns.; fairly common at times.
 98. *Cosmolyce boeticus*, L. (The Long-
 tailed Blue) Common on Hill, especially from 2400
 ft.; larva on *Crotalaria*; the only b'fly
 common to Britain and Penang except
 for doubtful records of Painted Lady.
 99. *Lycaenesthes lycaenina*, ssp. *miya*,
 Fruh. Not common.
 100. *Niphanda tessellata*, Mre. Uncommon; taken in Bot. Gdns.; pretty
 species especially female.
 101. *Lampides celeno*, ssp. *agnata*, Drc. Hill, usually above 2000 ft.
 102. *L. pura* (2), Mre. Hill, 2400 ft.; uncommon.
 103. *Nacaduba pactolus*, ssp. *odon*,
 Fruh. Hill, 2500 ft.; rare.
 104. *N. nora*, ssp. *ardates*, Mre. Common on grass, etc.
 105. *N. calauria*, ssp. *icena*, Fruh. Hill, 2400 ft.; rare.
 106. *N. kurava*, ssp. *nemana*, Fruh. Bot. Gdns.; on sand nr. Waterfall, rare.
 107. *Catochrysops cnejus* (2), F. Not common.
 108. *C. pandava* (2), Hsf. Common; gardens, etc.
 109. *Zizeeria otis*, ssp. *lysigone*, Snell. Abundant on lawns, etc., v. small.
 110. *Chilades latius*, Cr. One taken, Pulau Kera island off Pen-
 ang; not known before s. of Langkawi Is.

THECLINAE.

111. *Spindasis lohita*, ssp. *senama*,
 Fruh. Penang Hill, jungle tracks; occasional.
 U-side v. pretty.
 112. *Iraota rochana*, ssp. *boswelliana*,
 Dist. Hill; occasional; several taken on the
 same bush, c. 2200 ft. up at intervals of
 years.
 113. *Horsfieldi narada*, ssp. *taoana*,
 Mre. Botanic Gdns., rare; U-side just like dry
 leaf with stalk metallic-blue lustre
 above.
 114. *Amblypodia* (= *Arhopala*) *lycaen-*
aria (2), Feld. Common in jungle, Hill; medium size.
 115. *A. atosia* (2), Hew. Occasional; Hill, jungle; med. size.
 116. *A. agesilaus*, Stgr. Occasional; Hill, jungle; med. size; pre-
 fers deep jungle; identification difficult.
 117. *A. avatha*, Nic. Hill jungle area; rare.
 118. *A. antimuta* (2), Feld. Ditto, small.
 119. *A. horsfieldi*, ssp. *basiviridis*, Nic. Ditto.
 120. *A. fulgida*, ssp. *singhapura*, Dist. Ditto.
 121. *A. anniella* (2), Hew. Hill summits, 2500 ft.
 122. *A. diardi*, ssp. *almansor*, Fruh. ... Ditto, rare.
 123. *A. absens*, Hew. Hill lower parts; rare.
 124. *A. atrax*, Hew. Hill; common, to 1000 ft.

Species of this large genus are very hard to distinguish and I have many unidentified specimens; so some marked "rare" are probably commoner than believed, and others doubtless occur. *Amblypodias* are often common along certain jungle paths on the Hill and their vivid upperside blue or purple flashes beautifully in the gloom.

125. *Dacalana vidura*, ssp. *burmana*,
Mre. Edges of paths in jungle on Hill where
exposed to sunlight; but uncommon.
126. *Tajuria cippus*, ssp. *maxentius*,
Fruh. Not uncommon; a fine b'fly.; h.w. with
two tails each.
127. *T. mantra*, Feld. Botanic Gdns.; rare.
128. *Charana jalindra*, ssp. *burbona*,
Hew. This and following species are rare,
beautiful insects, seen occasionally on
the Hill in gardens or jungle, usually
near the summit.
129. *Remelana jangala*, ssp. *travana*,
Hew. Ditto.
130. *Sinthusia malika*, ssp. *amata*, Dist. Ditto.
131. *Horaga halba*, Dist. Ditto.
132. *H. viola*, Mre. Ditto.
133. *Catapaecilma elegans*, ssp. *emas*,
Fruh. Nr. Botanic Gdns.; 31.1.37; v. rare; very
pretty underside.
134. *Hypolycaena erylus* (2), Godt. Not uncommon; dark blue above; shin-
ing grey below, w. eye spots and two
tails each wing.
135. *Drina maneia*, Hew. Penang Hill; one specimen, 6.1.38; male
splendid iridescence above.
136. *Marmessus lisias*, ssp. *moorei*,
Dist. H.w. glowing blue above; U. black
marks on white, 2 eye spots and 3 tails
each side; frequent in jungle.
137. *Neocheritra amrita* (2), Feld. Lower parts of Hill; rare; splendid b'fly
with tails over inch long.
138. *Eooxilides tharis* (2), Hbn. Not uncommon in jungle; long white
tails give head-like appearance to h.w.
torni in resting position.
139. *Rapala jarbus* (2), F. Fine dark red above; big tornal eye
spots below; uncommon.
140. *R. dieneces* (2), Hew. Very rare; one taken 12.12.37, water-
course, N. coast.

PORITINAE.

141. *Poritia sumatrae*, Feld. Occasionally on Hill summits; delicate
purple iridescence; intricate pattern be-
low—browns.
142. *P. phalia*, ssp. *potina*, Hew. Rather similar; v. rare; one on Hill,
20.2.38.

HESPERIIDAE.

143. *Hasora badra* (2), Mre. Rare; one of the few N.E. "Kedawi"
b'flies found in Penang; in dark, 6.45
p.m., Bot. Gdns., 4.8.37.
144. *Burara etelka*, Hew. V. rare; Hill, 6 p.m., 5.1.38—worn.
145. *Badamia exclamationis*, F. V. rare; Botanic Gdns., 8.8.37.
146. *Orthophaetus phanaeus* (2), Hew. V. rare; Hill, jungle, 500 ft.; 13.11.37.
147. *Celaenorrhinus asmara* (2), Btlr. V. rare; watercourse, N. coast, 17.6.37.
148. *C. aurivittatus*, ssp. *cameroni*,
Dist. Hill, usually c. 2000 ft.
149. *Tagiades gana*, ssp. *perakana*,
Fruh. Rare in Penang; one taken on gangway
of steam ferry.
150. *T. litigiosa*, ssp. *ultra*, Evans. V. rare; one, Hill, 1300 ft., 26.12.37.
151. *Darpa pteria*, ssp. *dealbata*, Dist. Rare; Western Hill summit, 2600 ft.
152. *Ampittia dioscorides*, F. Not common; taken in south.
153. *Iambrix salsola* (2), Mre. Common, as elsewhere in Malaya.
154. *Ge geta*, Nic. V. rare; one, Hill jungle, 25.2.36.
155. *Kerana gemmifer* (2), Dre. Penang Hill; rare elsewhere in M.
156. *Udaspes folus*, Cr. Uncommon.
157. *Notocrypta* sp. Occasional in jungle, Hill.
158. *Unkana attina* (2), Hew. V. rare; Bot. Gdns., noon, 26.9.37.

159. *Hidari irava*, Mre. Common; flies at dusk, sometimes entering houses to rest, like *Amathusia*.
 160. *Oriens gola*, ssp. *rajagriha*, Fruh. Penang Hill, 2500 ft., 25.2.36; rare.
 161. *O. goloides*, Mre. Ditto, 14.11.37; rare.
 162. *Padraona* (= *Potanthus omaha*, Edw.) *maesoides* (2), Btlr. ... A common little Skipper, yellow-gold w., black markings.
 163. *Telicota augias*, ssp. *colon*, F. Fairly common, resembles the above, but larger and brighter.
 164. *T. bambusae* (2), Mre. Less common in Penang.
 BAORIS (a genus which has undergone much subsequent revision).
 165. *B. oceia*, ssp. *vel. kumara* Hill, rare; one on 27.2.36.
 166. *B. contigua*, Mab. Hill; fairly common nr. top.
 167. *B. zelleri*, ssp. *cinnara*, Wall. Hill; v. rare; one on 26.4.35; a mountain species.
 168. *B. guttatus*, ssp. *bada*, Mre. Hill, uncommon; summit, 25.2.36.

PUPAL MANDIBLES IN THE CURCULIONIDAE.

By H. DONISTHORPE, F.R.E.S., F.Z.S., etc.

(Continued from p. 37.)

(2) Tatsächlich hat Sir Guy Marshall auch bei *Perperus*, *Listroderes* und *Desmidophorus* die Narbe bzw. den Mandibelanhang gesehen (briefl. Mitt.)." p. 68.

"Seit dem Druck dieser Seiten vermochte ich die S.68 erörterten Merkmale der *Sitonini* und von *Scythropus* noch etwas zu klären. Ich erhielt ende April 1936 durch den Deutschen Pflanzenschutzdienst einige lebende *Sitona*-Larven zur Bestimmung und nahm die Tiere in Petrischalen mit Fliespapier und kleinen Kleepflanzen in Einzelzucht. An den Puppen färbte sich vor dem Schlüpfen die Mandibelschneide auffallend stark und vorauseilend aus, an ihrer Spitze besonders ein feiner, dornartiger Fortsatz. Diese Teile waren vor dem Schlüpfen völlig schwarz und gingen durch einen schmalen verwaschen braunen Streifen sehr plötzlich in den weiszlichen groszen Rest der Mandibel über. Beim Schlüpfen wiesen die 3 Imagines an der Stelle dieses Fortsatzes ein langes, spitz zahnförmig vorstehendes Chitingebilde (Abb. 5A) auf; das durch eine feine Linie abgesetzt erscheint und dem in Abb. 1 dargestellten Anhang von *Eugnathus* homolog. ist. Bei einen Vergleich der geöffneten Mandibeln mit solchen im Freien gefangener *Sitona* gewinne ich allerdings die Überzeugung, dasz das Gebilde nicht abfällt, sondern durch Abnutzung zum dorsalen (bei der rechten Mandibel apikalen dorsalen) stumpfen Zahn wird. Eine Narbe kann demnach bei *Sitona* nicht vorhanden sein (entgegen meiner Annahme S.68)." pp. 235-36.

The following is a list of the species of *Curculionidae* which have retained the pupal mandibles and which may be found in a drawer in the Cabinet of British Coleoptera in the British Museum (Nat. Hist.):—

- Otiorhynchus fuscipes*, Walt. 2 specimens. Box Hill, ex Coll. Power.
 Left mandible retained.
O. tenebricosus, Hbst. Tavistock, iv.1908. "W.J.M." Right mandible retained.

- O. atroapterus*, De G. Deal, 11.iii.1893. Donisthorpe. Both mandibles retained.
- O. sulcatus*, F. Oakham, 1886. Donisthorpe. Both mandibles retained.
- O. scabrosus*, Marsh. Folkestone, 17.viii.1911. Donisthorpe. Both mandibles retained.
- Trachyploeus scabriculus*, L. Norwich, ex Coll. Power. Right mandible retained.
- Strophosomus coryli*, F. Weybridge, 1.viii.1914. Donisthorpe. Both mandibles retained.
- S. capitatus*, De G. 5 specimens. Black Park, ex Coll. Power. 3 with both mandibles retained; one with right, and one with left mandible retained.
- S. faber*, Hbst. 2 specimens. Deal, ex Coll. Power. Left mandible retained.
- Exomias araneiformis*, Schr. Farnham, ex Coll. Power. Left mandible retained.
- Sciaphilus muricatus*, F. Balmuto, ex Coll. Power. Both mandibles retained.
- Liophilus nubilus*, F. Ex Coll. Bates, per Donisthorpe. Left mandible retained.
- Polydrusus sericeus*, Schal. Kimpton, Hants, Rudd, ex Coll. Smith, ex Coll. Bates per Donisthorpe. Left mandible retained.
- P. pterogamilis*, Sch. 4 specimens, Holm Bush, ex Coll. Power, 2 with both mandibles retained, 1 with right, 1 with left mandible retained; 2 specimens, Cowfold, ex Coll. Power, both mandibles retained; 1 specimen, Darenth, ex Coll. Power, left mandible retained; 1 specimen, Windsor Forest, 16.vi.1931, Donisthorpe, left mandible retained.
- P. cervinus*, L. 2 specimens, Maldon, ex Coll. Power, 1 left, 1 right mandible retained; 1 specimen, Tilgate, ex Coll. Power, right mandible retained.
- Phyllobius calcaratus*, F. Maldon, ex Coll. Power. Right mandible retained.
- P. urticae*, De G. One Cowley, one Hammersmith, ex Coll. Power. Both with left mandible retained.
- P. argentatus*, L. One Wimbledon, one Cowfold, one Weybridge, ex Coll. Power, all with left mandible retained.
- P. maculicornis*, Germ. Esher, ex Coll. Power. Left mandible retained.
- P. pomonae*, Ol. Bushey, ex Coll. Power. Right mandible retained.
- Philopedon geminatus*, F. Deal, iii.1895. Both mandibles retained.

If Coleopterists who possess any such specimens would kindly present them to the Nat. Hist. Museum, it would be much appreciated.

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I am much indebted to my friend, Dr van Emden, for kindly calling my attention to much of the above literature.

(To be concluded.)

COLLECTING NOTES.

NOTES ON VARIATION FROM THE WORTHING MUSEUM (*Continued from p. 30*).—*M. athalia*.—If we accept the specific difference between this and *pseudathalia (helvetica)*, the distribution of this species is peculiar, because though mostly a northern insect we find it also in N. Italy, the Tyrol, some of the Balkan states, Hungary, and some few parts of Switzerland, and by no means always in mountain localities. It is represented here from all the above localities as well as from England, France, Germany and Finland. Taking the English examples as a standard of comparison, the average of the French ones is slightly larger, especially in the ♀s, which are always larger than the ♂s of the same locality wherever taken. The German examples from the Black Forest are larger again, while those from Finkenkrug (many of them bred) are the largest of all. The Swiss examples from Altmatt and the Italian from Cadenabbia are the smallest and dullest of all. Those from S. Finland are about the size of the English ones, but the ♂s slightly smaller. Those from the Tyrol are rather large and bright, the ground colour being a very orange-brown. The Hungarian race, *mehadiensis*, is also rather large and bright with very decided black markings. There is a pair from the Bukovina, and another from Bulgaria of average size and rather dark. There is not much scope for variation in this species, but such as there is is fairly well represented here. Some of the bred specimens from Finkenkrug and one from Hinterzarten show distinctly paler central bands on both wings on the upperside with a pinkish tinge, a tendency towards the ab. *leucippe*, which is given as a ♀ form, whereas these are all ♂s. There is some variation in the breadth of the black markings which varies in most localities and shows no geographical peculiarities; the English forms here are the most varied in this respect. The Tyrolean examples are on the whole the most lightly marked and the Finnish the most regularly, though a ♀ of the latter has the markings on the forewing obsolescent. There is a ♀ from Samoussy (Aisne) with a light central band on the forewing, but this specimen is rather faded. The breadth of the central band on the underside hindwing varies a good deal. It is much broadest in Samoussy specimens and in *mehadiensis*, where the two divisions coalesce. It is very narrow in the Finland specimens when the two divisions are of almost equal breadth, giving quite a distinctive facies, which is enhanced by the very yellow colour of the band. This varies, often in the same localities, from nearly white (this is especially the case in the German specimens), to the yellow of those from Finland. Tyrolean examples are of a palish

yellow, as are the English, but the shade varies considerably in different individuals. With regard to *pseudathalia (helvetica)*, which for the purpose of these notes I am regarding for the moment as the same species, there is almost a drawerful of Swiss specimens not one of which fully bears out the original description of *helvetica*, though a few of them come from Bergün on the Albula Pass, the actual locality of the original specimens, so that there seems something incongruous in the use of this name. The two were separated entirely on the genitalia and all things considered the differences do not seem to amount to specific distinction.* The only specimen of either form with pure white central bands referred to in *athalia* occurs in one of this form from Frenières, though some from the Pfynwald and one from the Schafberg are nearly so. The first three rows of this form are from the Rhone Valley, consisting of short series from Charpigny, S. Triphon, Lavey, Aigle, Bex, Frenières, Martigny, Vernayaz and the Pfynwald, each possessing their own facies even in spots so close together as Charpigny and S. Triphon, Aigle and Bex, Martigny and Vernayaz, but the distinctions are impossible to describe adequately; they are rather to be felt in a series than described individually. The localities themselves are different. Those from Charpigny are from fields on the top of the rock, those from S. Triphon from the rather wet ground below, those from Lavey from a dry hill-side, those from Aigle from a more wooded place, those from Bex from the banks of the canalized river, those from Frenières from a higher level. This probably accounts for the slight differences in the look of the series. The largest specimens are from Frenières and the Pfynwald, though the smallest specimens also come from the latter. The ♀s from all localities are larger than the accompanying ♂s. Charpigny specimens are rather larger than those from S. Triphon. Those from Lavey tend to a loss of the dividing line in the centre of the upperside hindwing, which is complete in one specimen; specimens occur elsewhere in which this is almost complete—here there are single cases from Martigny, Caux and Digne. Next to these three rows comes a series from Eclépens, very varied both in size and markings. The following 2½ rows are from mountain localities, Caux, Bergün, the Murgthal, the Meienthal, the Engadine and Bérissal, and on the south side of the Alps the Laquinthal, Gondo and Faido; those from Caux and Bérissal tend to be larger while the others are all small, one of the ♀s from Caux being specially large. The rest of the Swiss specimens are from low levels south of the Alps, Cama and Roveredo near the foot of the Bernardino Pass, the Val Maggia and Reazzino. These are all rather large and with bright ground colour, but those from the Val Maggia are darker than the others. Lastly there are two from Coire, taken on the same day by Mr Fison, but quite unlike, especially in strength of black markings on the upper side and breadth of the central light band on the underside hindwings. The next drawer contains series from the district of Aix-les-Bains, Digne, the Pyrenees, La Granja, Paglino and Iselle on the south side of the Simplon, and the Monti Sibillini. The Aix specimens are a compact looking lot, but vary greatly in the details of the black markings, no two being alike; the Digne specimens are unexpectedly small; those from the

*NOTE.—Mr Warren has pointed out *racial* distinctions in the case of *Erebias*, which, though constant, are not considered to imply specific difference.

Pyrenees rather large and dark, especially dark from Cauterets and large from Vernet. Those from Iselle have a dark but bright ground colour and are a handsome lot, those from Paglino, rather higher up the Pass, are smaller; the Monti Sibillini specimens are small and light.

M. cinxia. A short series from the Isle of Wight (where this species seems to be spreading considerably) shows large ♀s, but the ♂s are in no way remarkable; *cinxia* indeed shows little scope for variation. The Guernsey specimens include one much suffused ♀ and one tiny ♂, also another ♀ with the second black line from the border obsolescent. The Swiss specimens are mostly from the Rhone Valley, but there is one ♀ from S. Georges and another from Eclépens, both in the Jura; the latter is very large, but one from Aigle is still larger; otherwise there is nothing noticeable. There is also a small one from S. Gimignans. The next row contains mountain specimens, from Bérisal, Morcles, Caux and Gondo in Switzerland, Oberbozen in the Tyrol and La Grave in France. The ground colour is perhaps rather lighter, but there is nothing else to note till we come to the specimens from La Grave. These (taken in mid-June 1927) are all small with a strong tendency towards clay-colour, giving them a different facies from any other series. There are rather large specimens from the Pyrenees and also from the Rennes district; one from Samoussy is small with rather light ground colour. There are a few from the French Riviera, Aix-en-Provence and Digne, the first-mentioned being rather large. A set from Aix-les-Bains are rather small and show a lighter ground colour, but not inclining to clay-colour like those from La Grave. There are two specimens of a second brood, one from Vernet and the other from the Rennes district. There is also a short series from Mt. Olympus, rather large and dark and with heavy black markings. There are three from Akbès and half-a-dozen from Tokat, the latter small and with lighter ground colour, in fact very like those from Aix-les-Bains. (*To be continued.*)—Rev. G. WHEELER, M.A., F.R.E.S.

LEUCANIA L-ALBUM IN WORCESTERSHIRE, 1925.—Until recently this species was rarely observed and an interesting occurrence of it in the Midlands in 1925 has so far been overlooked. In the *Proceedings of the Birmingham Natural History and Philosophical Society*, vol. xvi, part iv, September 1933, I issued a "Register of extinct, rare or local species and varieties of Lepidoptera in the collection of the Birmingham N.H. and Ph. Soc." The entry is as follows:—" *Leucania l-album*, L. A good specimen of this very rare visitor was taken in the moth trap on Hartlebury Common on July 1st, 1925." An earlier note of this specimen is in part iii, vol. xvi, 1932, of the above *Proceedings* where Mr J. H. Grant details the moth trap that was operated by the Society on the Common. Mr Grant gives a list of species taken in the trap and also gives information of old records of insects taken there years previously by Mr W. H. Edwards, who supplied their names. Amongst other species observed there Mr Edwards records the following:—" *Agrotis praecox*. Taken on heather bloom at night. *A. vestigialis*. Found resting on sand at dusk." I reset the above specimen of *L. l-album* when I went through the Society's collection and made the Register, but the whole collection has now been destroyed by enemy action.—P. SIVITER-SMITH, Little Aston Park, Streetly, Staffs.

THE ASSEMBLING SCENT OF *ARCTIA VILLICA* AND *PARASEMIA PLANTAGINIS*.—In July 1940 I had in an assembling cage some females of *P. plantaginis* and a single female *A. villica* with the object of assembling for male *plantaginis* by day near Petersfield en route for Hayling Island, where I intended to assemble male *villica* at dusk.

Male *plantaginis* assembled in countless numbers to the cage when it was put down on a suitable spot on the Downs and I amused myself by watching their antics in trying to pair with the female *villica*, which I had placed on the outside of the muslin cage, whilst their legitimate brides sat hopefully on the wrong side of the mesh to fulfil these intentions. In no case did a pairing succeed and the female *villica* appeared to resent these attentions.

At dusk on Hayling Island I left in the car the box containing the female *plantaginis*, where they had been transferred some four hours previous on leaving the Downs, and proceeded on to the sand-dunes with my assembling cage containing the female *villica*. In the following hour (10.30 to 11.30 p.m. summer time) I saw no male *villica*. However, on my return to the car my wife reported that there had been many *villica* flying around the car. Several were still flying around as I approached.

On opening the dickey of the car they rapidly made their way to the wooden box (with perforated zinc ends) where the *plantaginis* were shut up. On opening this they were quick to attempt to pair with them but in every case failed and only succeeded in knocking the females down from the sides of the box.

My explanation of this at the time was that the scent of my female *villica* must have lingered strongly in and around the wooden box, and I forgot the whole incident.

In July 1941, however, I happened to visit my cages about midnight one night where I was breeding *plantaginis* in big numbers in my garden at Cranleigh, Surrey. I found male *villica* flying around and attempting to enter these cages. I assumed that as I was not breeding *villica* I must have accidentally introduced a female into the cages.

The following morning I turned out the cages to look for it and beyond finding one or two male *villica* sitting on the muslin on the outside there were no signs of female *villica*.

The same night (24th July) I therefore took a new assembling cage and introduced into it about a dozen virgin female *plantaginis*. This was put down at dusk on the lawn and as I was unable to be present my wife took over for me. On my return she reported that several *villica* had been flying around the cage. The following night (the 25th) I repeated the same experiment and saw many and caught five male *villica* assembling to the female *plantaginis*. I was able on subsequent nights to demonstrate this to R. Demuth and others.

There can be no doubt that the so-called "specific scent" of the species *plantaginis* is in fact not specific but is highly attractive to *A. villica*. Whether this ever happens in Nature is to be doubted because of the unlikelihood of any females of *plantaginis* being left unsatisfied from their afternoon mating flight, although they must overlap in their localities very commonly. It must be noted that the normal "calling" times of insects is greatly prolonged with caged and consequently unpaired females.

As an example the normal calling time of *P. dominula* is from mid-day till about five or six p.m., when one presumes that in Nature all available females are then in copula. On a hot summer's night last July, however, I caught at 11.15 p.m. in the dark a male *dominula* flying wildly around the cage containing an unpaired female of its species. It is to be assumed then that in Nature attempted pairings of *villica* and *plantaginis* such as I have described can rarely take place, because of the fact that the normal "calling" times do not overlap. If they coincided there can be little doubt that this would often happen. There is a long list of insects whose specific scents attract a second species, either nearly-related or otherwise, but so far as I am aware the above instance has not been recorded previously.—H. B. D. KETTLEWELL, F.R.E.S., M.A., M.B., B.Chir.

SUBSTITUTE FOODPLANTS.—Although the larvae of a great many of our moths are polyphagous, there are some which confine themselves to a particular family of plants. In these cases I suspect that chemotropism is involved. Probably all the species of plants within a family (not merely a genus) have a scent which contains a common element. On 11th July last year I found six larvae of *Cucullia verbasci*, L., on a solitary *Verbascum thapsus*, L., growing on a railway embankment. (Incidentally it is the only mullein plant I have seen in this neighbourhood.) Placed on *Scrophularia aquatica*, L., they began to eat the new food at once. Yet the leaf textures of these two plants seem to us humans to be poles apart: the one spongy, thick, and covered with "wool," the other thin, glabrous, and glossy. It would be interesting to know if *Cucullia verbasci*, L., would readily eat other plants of the family Scrophulariaceae, e.g. Toadflax, Mimulus, Foxglove, the Speedwells, and Cow-wheat. On 31st August I put two full-fed larvae of *Notodonta dromedarius*, L., taken from birch, on alder. They also set to at once. *N. ziczac* will make successive meals of Black Poplar, Lombardy Poplar and Aspen. On the other hand, I have read that although *Acronycta alni*, L., is widely polyphagous, whatever foodplant is given at first must be continued to the last; but perhaps this is an "old wives' tale."—P. B. M. ALLAN, Newtown, Montgomeryshire.

COLEOPTERA TAKEN ON AND IN A GARDEN REFUSE HEAP.—NOTE—This heap was being decayed down for garden purposes with Adco. Being unable to do much collecting in the outside district on account of the war, I spent what time available collecting beetles from the above refuse heap in my own garden with rather gratifying results from July 7th-21st, September 9th-November 15th. *Amara aenea*, De G., *A. ovata*, F., *Calathus fuscipes*, Goez., *Sphaeridium bipustulatum*, F., var. *semistatum*, Cast., *Leucoparyphus silphoides*, L. (4), *Tachinus humeralis*, Gr., *T. subterraneus*, L., *Quedius mesomelinus*, Marsh., *Q. tristis*, Gr., *Q. cinctus*, Pk., *Ontholestes tessellatus*, Fourc. (about a dozen), *O. murinus*, L. (very plentiful), *Philonthus intermedius*, Bois., *P. aeneus*, Ross., *P. carbonarius*, Gyll., *P. rectangulus*, Sharp (9) (new to the district list), *P. ebeninus*, Gr., *Xantholinus glabratus*, Gr., *Leptacinus parampunctatus*, Gyll., *Oxytelus sculptus*, Gr., *Hister merdarius*, Hoff. (2) (new to the district list), *Anthicus floralis*, L.—F. T. GRANT, 37 Old Road West, Gravesend.

COLEOPTERA IN STACK REFUSE.—The following species were taken during December 1941 from one haystack near Gravesend. There are 58 different species (excluding a few *Atheta* not yet identified) taken. Six species are additions to the district, marked with an asterisk.

Bradycellus verbasci, Duft., *Metabletus foratus*, Geoff., *Megasternum boltophagum*, Marsh., *Atheta* (*Datomicro*) *zosteræ*, Th., *A.* (*Coprothassa*) *sordida*, Marsh., *A.* (*Acrotona*) *fungi*, Gr., **Amischa analis*, Gr., **Tochyusa constricta*, Er., **Oligota parva*, Kr., *Tachyporus chrysomelinus*, L., *Tachinus marginellus*, F., *Myctoporus splendens*, Marsh., *Heterothops dissimilis*, Gr., *Philonthus sordidus*, Gr., *P. concinnus*, Gr., *P. immundus*, Gyll., *P. nigrutilus*, Gr., *Leptachinus bathychnus*, Gyll., *L. linearis*, Gr., *Stilicus orbiculatus*, Pk., *Medon propinquus*, Bris., *Stenus prunnipes*, Steph., *S. ossium*, Steph., *Oxytelus rugosus*, F., *O. inustus*, Gr., *Megarthus affinis*, Müll., *M. depressus*, Preyss., **Pseudopsis sulcata*, New. (2), (a great find), *Calyptomerus dubius*, Marsh., *Catops nigricans*, Spence, *Scydmaenus tarsatus*, Müll., *Stilbus testaceus*, Pz., *Micropeplus fulvus*, Er., *Monotoma picipes*, Hbst., *Enicmus minutus*, L., *E. transversus*, Ol., **E. histria*, Joy., *Corticarina fuscula*, Gyll., **Ahasverus advena*, Woll., *Cryptophagus distinguendus*, Stm., *Atomaria nigripennis*, Pk., *A. apicalis*, Er., *A. ruficornis*, Marsh., *Ephistemus globulus*, Pk., *Thyphaea stereorea*, L., *Oxyomus silvestris*, Scop., *Phyllotreta nigripes*, F., *P. undulata*, Kuts., *Chaetocnema concinna*, Marsh., *C. confusa*, Boh., *Apion assimiles*, Kirby, *A. flavipes*, F., *A. nigritarse*, Kirby, *A. virens*, Hbst., *A. filirostre*, Kirby, *A. tenue*, Kirby, *Phytonomus nigrirostris*, F., *Tychius picirostris*, F., *Ceuthorrhynchidius floralis*, Pk.—F. T. GRANT, 37 Old Road, W., Gravesend.

CURRENT NOTES.

The Revista Soc. Ent. Argentine, Vol. xi, No. 3, recently received, contains nine papers, 4 dealing with Coleoptera, 1 with Hemiptera, 1 with Orthoptera, mainly of insects of economic importance, and 2 dealing with Lepidoptera of which the first gives the life-history of the Syntomid, *Eurota hermione*, with a plate; the other is a List of the Lepidoptera of Catamarca.

The Report of the U.S.A. National Museum, 1941, contains many items referring to the Insect Fauna of the world besides the usual records of the year's work in all departments of scientific work. Short records are made of various expeditions for exploration which were carried out. There were 1136 accessions to the Biological Sections of the Museums, with a total of over 260,000 specimens. These accessions included Coleoptera from Costa Rica, Bees sent by Prof. Cockerell, Galls of Indiana, etc., etc. A large quantity of type material was included in most of the collections. A summary of the accessions with the donors' names fills 38 closely printed pages. The Report ends with the full titles of all the Publications issued by the Museum authorities during the year. One would like to have a similar Report of the activities of our British Museums during the year. "For the Increase and Diffusion of Knowledge among Men."

ORIG. DESCRIP.—“The colour of the front wing is ferruginous-purple, faintly tinged with orange-yellow on the costal margin near the tips. The median band is not excavated on the inner border, and is shown distinctly by a thread-like orange line on each border, which extends from the costa to the inner margin. The hindwing is slightly darker, more rosy than in normal specimens.” Ripon.

ab. *pallida*, Stdgr., *Iris*, IV, 299 (1891).

ORIG. DESCRIP.—“The specimens obtained in great numbers in Amasia, caught in October, are altogether so different from the typical West European *xerampelina*, that I call it var. *pallida*, which name characterizes the whole of the specimens. They are in all parts far paler than the typical form; the forewings are uniformly reddish-yellow or reddish-grey, rarely grey-yellow. They bear only the two dark, light margined transverse lines and generally have the somewhat darker, but never blackish, large reniform stigma, which not infrequently is almost quite obsolescent. An aberrant ♀ from Amasia has so dark red-brown forewings that it can be placed to ab. *unicolor*. The single male I have from Beirut is distinguished by a slightly blackish darkened reniform stigma and a sharp black dot in the basal part of the middle cell.

[This has been considered a separate species by Wiltshire. If so *maculifera* and *flava* will be abs. of the new sp.]

In the two females caught at Jerusalem in the beginning of November, the reniform is far more conspicuous, fully filled in with blackish, and the basal dot equally emphasised sharply in black. One of these females is pale brownish, the other greenish-yellow-grey; the latter has almost wholly white hindwings. If this turn out to be a local form in Syria, I name it var. *maculifera*.”

ab. *maculifera*, Stdgr., *Iris*, IV, 299 (1891).

ORIG. DESCRIP.—“The single ♂ lying before me from Beirut is distinguished by a slightly blackish darkened reniform stigma and a distinct black dot in the basal part of the middle cell. In two females captured at Jerusalem at the beginning of November the reniform stigmata are far more prominent, filled in completely with blackish, and the basal spot similarly developed quite black. One of these females is pale brownish, the other greenish-yellow-grey coloured, the latter has almost wholly white hindwings. I think that this form with the conspicuously blackish reniform stigmata and the blackish basal spot may be constant in Palestine and probably also in Syria, and if so, well deserves to bear a special name, which I give as var. *maculifera*.”

Hoff. & Klos., *Schm. Stierm.*, III, 145 (1915). described a race of *xerampelina*, but did not name it. [*rufescens*, n. race.]

ORIG. DESCRIP.—“The Stainz forms belong to a fine local race, which are distinguished from specimens from Aachen in that the ground is reddish not golden-yellow. The surface of the marginal area and part of the suffusion of the discal area is not violet-red but grey-black.”

This is near *unicolor*, Stdgr., but is not red throughout nor is the red “carnation red” as in that form. It might be called *rufescens*, n. race, if not already named.

ab. *nigropicta*, Schwarzh., *Verh. z.-b. Wien*, LXXI, 156 (1921).

ORIG. DESCRIP.—“Two ♀ examples with black reniform stigma, brown-black lower half of the discal area, and the outer margin of the forewing similar.” Herzegovina.

ab. *lutea*, Bromb., *Int. Ent. Zts.*, XXV, 144 (1931).

FIG.—l.c., f. 1, 2.

ORIG. DESCRIP.—“The middle is obsolete. Up to the darker very narrow marginal area the examples bred are citron-yellow. The hindwings are quite normal.” Two bred. Freiburg.

ab. *flava*, Rbl., *Zeit. Oestr. Ent. Ver.*, XVIII, 24 (1933).

ORIG. DESCRIP.—“Ground colour citron-yellow without any reddish infusion. The two transverse lines of the forewings indistinct, white edged on their convex side. Reniform indistinct.” Ankara.

Dicycla, Gn. (1852), Barr., *Stdgr.*, Hamp., Splr., Sth., Warr., Culot, Drdt. [*Zenobia*, Oken. (1815), Drdt.-Stz.: *Tethea*, Ochs. (1816), Dup., H.-S. (non descrip.): *Carradrina*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Cymatophora*, Tr. (1825)] oo, L. (1758).

This was considered a *Bombyx* by Linn. and by many subsequent authors.

In 1816, *Schm. Eur.*, IV, p. 64, Ochs. gave a preliminary sketch of the classification of the Bombyces and Noctuae. He gave names to genera he proposed (but did not describe them). Among those was a genus name *Tethea* embracing 14 species, including oo, L., which was considered a *Bombyx* by all early authors, and associated with *or*, *flavicornis*, *fluctuosa*, *diluta*, *retusa*, *subtusa*, etc. *Tethea* was number XLVIII. In 1822 Ochsenheimer died.

In 1825, Treitschke continued the publication of *Schm. Eur.* by issuing vol. V (1). In this he did not accept *Tethea*, Ochs., as it was preoccupied in the nomenclature of Polypes, and in place of it described and named the Genus *Cymatophora* (V, p. 77, 1825) in the first part of the “*Nachtschmetterlinge*,” and including practically the same species as Ochs. proposed.

Tutt, *Brit. Noct.*, III, 17 (1892): Meyr., *Hand.*, I, 18 (1895): Barr., *Lept. Brit. Is.*, V, 312, plt. 223, 3 (1899): Stdgr., *Cat.*, III ed., 203 (1901): Splr., *Schm. Eur.*, I, 243, plt. 45, 21 (1906): South, *M.B.I.*, II, 1, plt. 2, 1-2 (1908): Hamp., *Lep. Phal.*, IX, 234 (1910): Warr.-Stz., *Pal. Noct.*, III, 233, plt. 47k (1911): Culot, *N. et G.*, I (2), 69, plt. 51, f. 4-7 (1913): Meyr., *Rev. Hand.*, 72 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 154, plt. 19e (1934).

Rösel, *Belustigung*, I (2), plt. 63 (1746?), gave two figures quite recognizable, but too heavily coloured.

Esp., *Abbild.*, III, *Bomb.*, p. 365, plt. 71, 2-5 (1782+?), figured all stages.

Ernst. & Engram., *Pap. d'Eur.*, VIII, 1, f. 528a-h (1792), represented several forms of oo, L., very ably. They gave 23 references all under the name oo.

Hb.-Gy., *Samml. Noct.*, 195 (1800-3), gave an excellent figure, *l.c.*, 867 (1834), a beautiful dark var. with darker massed marking.

Haw., *Lep. Brit.*, dealt with *oo*, L., p. 238 (1809), under the name *ferruginago*, Hb., but stated that it was "praecedenti nimis affinis," i.e., closely related to another form, which he had just described as a species and named *renago* = the *renata*, Fab., but was "pallidior."

Tr., *Schm.*, V (1), p. 84 (1825), described *oo* as a *Bombyx* and treated *ferruginago*, Hb., as a *Bombyx* ♀. He placed it near *xanthoceros* (*flavicornis*) and much like *rumicis* at first glance.

Dup., *Hist. Nat.*, VI, 174, plt. 84, 2-3 (1826), gave two excellent figures, ♂ and ♀.

Freyer, *Neu. Beitr.*, II, 94, plt. 149, f. 3 (1836), gave a good figure of a remarkable aberration of *oo*, of which the greater part of the forewings were suffused with a deep mahogany-brown, leaving light (white) outer marginal band, the orbicular and reniform marked out in white, a light claviform, two elongate blotches on the costa light, the half-band at the base and the succeeding transverse narrow band also light in colour, and the thorax and abdomen a very pale yellow.

H.-S., *Sys. Bearb. Noct.*, II, 193 (1849), included the *ferruginago*, Hb., 193 and 866. He described one ab. without naming it. *Tethea*.

"*Ferrugineus-grisea*, the 3 stigmata, the median area towards the anterior margin and the three almost linear waved lines white. Rust-red mixed with grey; discal area towards the costa and the area behind the waved line near the stigmata white."

Gn., *Hist. Nat. Noct.*, VI, 7 (1852), included *ferruginago*, Hb., 195. He refers to *renago*, Haw., on account of its slight difference as "une prétendue espèce," and refers it to *renata*, Fb. *Dicycla*.

Guen., *Hist. Nat.*, VI, 8 (1852), referred to the *renago*, Haw., which had been considered to be the *renata*, Fb., 251? and thus would be a variety of *oo*. He noted that *oo* was sometimes a distinct yellow like the fig. *e* of Engram. and fig. 3 of Dup. He queried the *subflava*, Evrs., being a *Dicycla* and quoted the specific description of its author: "Alae anticae ochraceae, fascia lata baseos, striga media fasciaeque lata terminali fuscis; posticae lutescentes."

Stdgr., *Cat.*, III ed. (1901), p. 203, treated *ferruginago*, Hb., as a synonym, adopted the ab. *renago*, Haw., and described the form *sulphurea*, Stdgr.

Splr., *Schm. Eur.*, I, 243, plt. 45, f. 21 (1906), gave a very good figure. He recognized ab. *ferruginago*, Hb., ab. *renago*, Haw., and ab. *sulphurea*, Stdgr. *Dicycla*.

South, *M.B.I.*, II, 1, plt. 2, 1-2 (1908), gave two figures showing two forms.

Hamp., *Lep. Phal.*, X, 234 (1910), gave a good black and white figure of a typical form. The only forms he acknowledged were *renago*, Haw., and *sulphurea*, Stdgr.

Warr.-Stz., *Pal. Noct.*, III, 233, plt. 47k (1911), gave two figures: typical *oo*, L., and *renago*, Haw. They recognized three other forms, *ferruginago*, Hb., *sulphurea*, Stdgr., and *griseago*, Schultz. *Dicycla*, Gn.

Culot, *N. et. G.*, I (2), 69, plt. 51, f. 4-7 (1914), gave four beautiful figures: 4, is typical; 5, ab. *ferruginago*, Hb.; 6, is ab. *griseago*,

Schultz; 7, is ab. *sulphurea*, Stdgr. He refers to ab. *renago*, Haw., suffused with ferruginous brown. *Dicycla*.

Barrett described the Variation as follows:—

Usually but little variable, though in some individuals the markings are more sharply defined and richly coloured than in others. Occasionally the yellowish-white ground is faintly obscured by a slight shading of purple-red from the lines. But there is a very handsome recurrent form, known as var. *renago*, in which the whole broad area of the forewings from the outside edge of the reniform stigma to the subterminal line is filled with rich purple-red forming a wide band across the wing, and continued along the dorsal area till it joins the basal blotch; in this form the portion of this broad band which lies between the second and subterminal line is frosted with plum-colour as in the basal blotch. Such examples appear to be more frequently found in Northampton. There is besides a little tendency to local variation in colour, those taken in the New Forest being of a more yellow tint than those from Essex; and in some individuals the two upper stigmata are joined at their margins.

The Names and Forms to be considered are:—

- oo*, L. (1758), *Sys. Nat.*, Xed., 507.
- f. *ferruginago*, Hb. (1800-3), *Samml. Noct.*, f. 195.
- ab. *renago*, Haw. (1809), *Lep. Brit.*, 238.
- ab. *subflava*, Ev. (1848?), *Bull. Mosc.*, No. 3.
- ab. *maculifera*, Stdgr., *Iris*, IV, 299 (1891).
- ab. *rufescens*, Tutt (1892), *Brit. Noct.*, III, 18.
- ab. *sulphurea*, Stdgr. (1901), *Cat.*, IIIed., 203.
- ab. *griseago*, Schultz (1906-7), *Soc. Ent.*, XXI, 3.
- ab. *conflua*, Holz. (1921), *Int. Ent. Zt.*, XV, 79.
- ab. *rufocarnago*, Dnhl. (1925-6), *Ent. Zt.*, XXXIX, 134.
- ab. *olivacea*, Skala (1935), *Seitz, Supp. Pal. Noct.*, III, 190.

Tutt dealt with (1) the typical *oo*, pale yellow without subterminal shade; (2) var. *rufescens*, reddish-yellow, without dark terminal shade; (3) f. *ferruginago*, with a dark transverse shade between the elbowed and subterminal lines; (4) *renago*, Haw., with a dark transverse shade between subterminal line and central shade.

Tutt said of *subflava*, Evers., that probably it was the *ferruginago*, Hb., f. 195. But in the diagnosis in Eversmann there is no mention of ferruginous markings, as in Hb. & Haw. Evers. suggests that it may be a form of *citrago*, which it much resembles except in basal colour.

Eversmann, *Bull. Mosc.* (1848), No. 3, described a Noctuid *subflava* as like *oo*: "Alae anticae ochraceae, fascia lata baseos, striga media fasciaeque lata terminali fuscis; posticae lutescentes." In his articles on the Noctuae of the Volga regions Eversmann did not mention this name in connection with *oo*, but likened it to *citrago* and called it a *Xanthia* sp. (1855), p. 371. On p. 362, *l.c.*, he described two forms of *oo*. β "Alis anticis pallide ochraceis; basi fasciaeque latissima externa fusco-ochraceis." This he amplified into "The base of the forewings is occupied by a large ochraceous-brown spot, and the space between the median shade and the subterminal is filled with the same brown colour, forming

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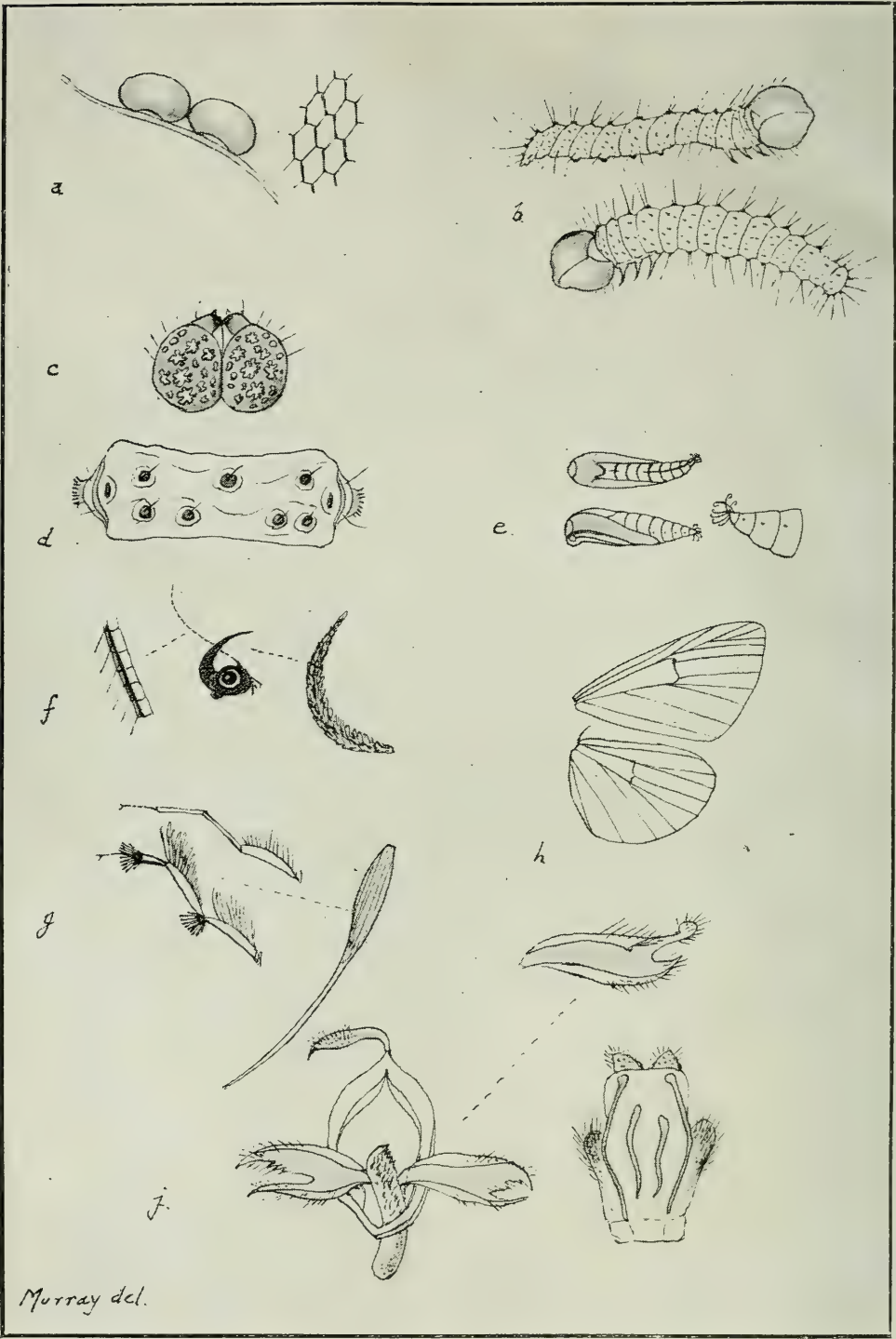
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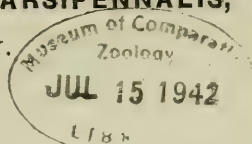


THE LIFE-HISTORY OF ZANCLOGNATHA TARSIPENNALIS, TR.

By REV. DESMOND MURRAY.

13,820

Plate III.



What are generally known as the "*Deltoides*" are a group of small dull-coloured moths, including the "Snouts" and "Fanfoots." The name was given from the figure made by the wings of the moth, when at rest, which closely resembles the Greek letter Δ (Delta).

Though this same figure is to be noticed with other moths at rest, as with the *Hyberniae*, *aescularia*, *hispidaria*, etc., the name is confined to the ones mentioned.

Such names as Deltoid, Annulet, Chevron, and similar ones, which our nomenclature retains, can be said to be obsolete words of a long-forgotten past.

There are in all five "Fanfoots," i.e., *tarsipennalis*, *barbalis*, *grisealis*, *cribralis*, and *derivalis*, unless the almost unknown *emortualis*—the "Olive-Crescent"—be included. The first-named is perhaps the most common and generally distributed species.

The popular name given to the "Snouts," on account of the elongate palpi, can be equally applied to the "Fanfoots." With these the palpi are sickle-shaped, turning upwards, but in addition they have an extraordinary "foot" or rather fore-leg, shown only in the male, that gives them their name. No very satisfactory explanation has so far been given for this appendage.

Judging from similar organs in other moths, it must be some kind of scent-organ, as a brush for the diffusion of scent. But why do these small moths possess such an organ and how does it function? Why is it not present in other similar moths? It was with this object in view, to find some solution to the problem, that some larvae of *tarsipennalis* were bred through from the egg and figures taken of all the stages.

Though no more definite conclusions were arrived at than that the organ must be used to help the sexes to find each other amongst the dense vegetation which they frequent, the details of the early stages may be interesting to others, who can perhaps record additional facts.

THE EGG:—The eggs are laid in June-July, singly or two or three together, scattered indiscriminately amongst leaves on the ground and on low plants under hedges. The egg is comparatively large for the size of the moth; white in colour, like a tiny dull pearl, touched a few days later with pink and appearing to be semi-transparent, in five or six days, when the larva emerges. The surface of the egg is marked with a very fine lace-work pattern, seen under a high-power objective.

THE LARVA:—On emergence the young larva measures less than 1 mm., dull white or flesh-coloured, armed with prominent setae. It grows rapidly feeding on various leaves supplied, going through four instars, as far as I could judge. By the end of August or into September it settles for hibernation. At this stage the larva is dull brown in colour dorsally, with darker spots, fleshy grey, ventrally; setae, short and stumpy; measurement, 6 mm. At first the larva is active enough but grows more sluggish to full growth, resting amongst curled-up dry leaves during the day, feeding occasionally during the night. By the middle of September the larva shows no movement, remaining stationary

during the next month. Some twisted dry leaves showed a slight web. From this time until March or April, when it appears to have shrunk, it remains motionless in hibernation, without any covering. This is one of the unusual habits of the larva uncommon with larvae above ground. The skin was shown to be very tough on dissection, being lined with a fatty substance. Such delicate larvae, however, as many of the *Geometrae* and even the *Pterophoridae* also remain above ground. Why do they not change when they have reached full growth and food is plentiful? Would excessive moisture be detrimental to the pupa stage? It is easy to ask these questions but not easy to answer them. Temperature does not explain hibernation.

THE PUPA:—After feeding again for a short period the larva settles for pupation during April or May, generally amongst the dry leaves with a very slight web. There is nothing peculiar about this stage, except the fine cremastral hooks.

FOOD PLANTS:—These consist of any leaves available: groundsel, sowthistle, lettuce, catkins, even apple rind. Withered leaves do not seem to be eaten, as stated by others; these are only used to hide in during the daytime.

THE IMAGO:—Measures usually about 30 mm., though it varies considerably in size. It is light brown in colour, with a darker line at the angle of the upper and lower wings. There is little to distinguish the moth from *barbalis*. On the fore-leg of the male there is a brush on the first joint and another more elaborate one on the second, consisting of long golden, clubbed setae, surrounded by shorter ones of rich brown. The foot-joint holds longish setae as well. If, as supposed, the hairs are scent brushes they may possibly scatter an attractive scent over the leaves and so enable the female to be more easily found, for it is the male which seeks the female, not *vice-versa*. Perhaps the thick damp herbage which they frequent necessitates such a device, yet many similar moths are not provided with it. The leg of the female, in comparison, is quite normal. The wing venation does not show any peculiarities and the frenulum is present.

Mr F. N. Pierce very kindly supplied me with mounts of the genitalia from which, and from my own, the drawing was made. Comparison with *barbalis* shows the costa with a pointed projection; in *tarsipennalis* it is blunt.

EXPLANATION OF PLATE.

(a) Egg and surface pattern. (b) Larva—1st instar, $\times 50$. (c) Larva—head, full growth. (d) Larva—setal map, 7th seg. at last instar, $\times 20$. (e) Pupa, $\times 2$, and cremastral process. (f) Imago—head showing palpi and antenna. (g) Foreleg of $\text{\textit{f}}$ and $\text{\textit{m}}$, with single seta. (h) Wing venation. (j) Genitalia, $\text{\textit{m}}$ and $\text{\textit{f}}$, $\times 25$, with single valva of *barbalis*.

EMERGENCES OF TRYPETIDAE.

By M. NIBLETT.

In the *Entomologist's Record*, March 1938, Mr H. W. Andrews detailed some experiences of his own, and of others, relating to varying times of emergence of several species of Trypetids. I have recently

examined my records of the thirty-four species of these insects that I have bred, and the following notes summarize the results.

It is, of course, necessary to breed the insects in some numbers to enable one to obtain sufficient data for really definite conclusions to be drawn. I have bred in all a little over 3500 Trypetids, some species to the number of several hundreds, of others a very few, but, with the exception of a few species, my experiments have produced the flies of many species over a number of years, and the results have been very consistent. Nearly all the gall-causing species, all the stem-feeding, fruit-feeding, and leaf-mining, and the majority of those inhabiting the flower-heads that I have bred, have emerged with great regularity at specific times. I have made it a practice to retain the bulk of the breeding material for at least twelve months after the flies emerged, and sometimes for a longer period.

Mr Andrews stated that he had *Orellia (Trypeta) vectensis*, Coll. emerge in the third year, that is, in 1937 from larvae produced in 1935. This type of emergence I have not had with any species; the few *vectensis* I have been able to breed all emerged in July of the second year.

Regarding *Euribia quadrifasciata*, Mg., I have had that species emerge in July and August of the same year from larvae or pupae collected in July; not once did any flies emerge in the following year from these larvae and pupae. From larvae collected later all the insects emerged in May or June of the following year. This shows that the species is definitely double-brooded.

Myopites eximia, Seguy (? *frauenfeldi*, Sch.)—From larvae of this species in flower-heads of *Inula crithmoides*, L., collected in August a certain percentage of the flies emerged in August and September, the remainder in the following June and July, which agrees with the experience of Mr Andrews. The emergences of *Noeëta pupillata*, Fall., are rather more complicated, and I should say it is a double-brooded species. From July larvae all the flies emerged in that month or in August; August-collected larvae gave the flies in August or September, and the May following. On one occasion flies emerged in November and in May from larvae collected in October, but as a rule those collected after August gave no emergences until the following April and May. Another peculiarity in connection with this species is the occurrence of both live pupae and larvae, or empty puparia and larvae together in the same galled flower-head.

I have not bred a large number of *Xyphosia miliaria*, Sch., but the results obtained point to its being double-brooded. From larvae collected in early or mid-July the flies emerged in August, but from all those collected from late July onwards there were no emergences until the following June or July.

Tephritis vespertina, Lw.—It is questionable whether this species is double-brooded. I have found the flower-heads of its host-plant, *Hypochaeris radicata*, L., as early as 10th June with both larvae and pupae in them, from which all the flies had emerged by 7th July. Many also have been found in early July with pupae in them, and from these all the flies had emerged by the end of the month. The latest date I have had this species emerge is 8th August; flower-heads were found once on 21st August with pupae in them, but no flies emerged from these.

Orellia colon, Mg.—We have here again a species that is double-brooded and also having a certain percentage of its larvae lying over. From larvae collected in July the flies emerged in August; from two series collected in early August, several flies emerged before the end of the month, the remainder coming out in the following June. From others collected fairly early in August no flies emerged until June, as did all those from later collected larvae.

Chaetostomella onotrophes, Lw.—I bred my first fly of this species in 1927; this, and all others bred until 1933, emerged in May or June of the second year. On 22nd July 1933, at Epsom Common, I collected a few flower-heads of *Centaurea nigra*, L., with larvae in them, and from these between 28th July and 4th August several *onotrophes* emerged. On 28th July 1940 flower-heads of the same plant were gathered in my garden at Wallington; from these two *onotrophes* emerged on 14th August, and early in the following June another sixteen came out. I have already recorded breeding this species from flower-heads of *Serratula tinctoria*, L., and *Unicus palustris*, L.; to these I can now add *Centaurea montana*, L. From larvae collected in flower-heads of this plant at Wallington on 6th June 1940 the flies emerged on 7th July. This plant has been recorded on the Continent as a food-plant of this species, but this, I feel confident, is the first record for Britain.

Dr Varley, as quoted by Mr Andrews, refers to galls of *Euribia jaceana*, Her., with larvae in them as late as September of the second year. I have not noticed any myself as late as that, but have had a belated fly emerge on 4th August from one of a series of galls from which the other flies had emerged in June. Parasitized larvae will sometimes remain unchanged long after their normal time for pupation has passed, but I have bred no parasites of this species later than July.

It is rather difficult to assign any specific reason for the late summer or autumn emergences of these insects where it is the general rule for them to emerge in the following summer. One can only speculate. Were they once purely double-brooded species, or did they at one time always emerge in the autumn and hibernate as adults; or is it purely an abnormal happening, some larvae reaching maturity in advance of the others owing to some additional stimulus they may have received, perhaps due to certain glands becoming more active? There appears to be little chance of these out-of-season flies helping to perpetuate the species; if the females were fertilized and deposited eggs, it could only be in material quite unsuitable for the young larvae to develop in, or for the eggs to remain dormant in through the winter, if such a thing were possible. I also very much doubt the possibility of the insects themselves surviving the winter in hibernation, it not being their habit. It rather seems as though these emergences are abnormal and quite a waste.

With certain species of the gall-causing *Cynipidae* we get partial retarded emergences as a more or less regular happening; a series of galls collected from the same plant in, say, the early summer, will have a certain percentage of the larvae pupate in the following spring and the gall-wasps emerge, but the remainder will continue in the larval stage until the next spring, when they will complete their transforma-

tions, some even extending this process over several years. I know of none of these insects, however, even emerging before their emergence time was due.

The proportion of males to females in the Trypetids I have bred has been fairly even, a total of 1752 males to 1796 females. With 16 species I bred a higher percentage of males; in the remaining species the sexes were about equal, or in the proportion of 8 males to 9 females.

I should be interested to hear of any other retarded or otherwise abnormal emergences of any of the *Trypetidae*.

HINTS ON THE MOUNTING OF DIPTERA.

By H. AUDCENT, M.Sc.

The identification of Diptera is based in the main on wing venation; morphological characteristics of head, body, and legs; the number and position of bristles and hairs thereon; and, in an increasing number of families, the structure of the male genitalia. It is preferable not to mount specimens when sending them for determination.

In the course of the last ten years correspondents have sent me many Diptera for determination. To my regret many of the specimens were useless and could not be determined owing to faulty preparation. The following hints, gathered from an experience of twenty years, may be useful to Dipterists and to those entomologists who desire to know the names of any Diptera that interest them.

1. HOW TO SEND UNMOUNTED DIPTERA BY POST.

Specimens should never be sent loose in a box or glass tube; such specimens usually reach their destination in bits. Neither should they be packed between layers of cotton-wool, as the threads get entangled in the antennae, legs, and bristles of the specimen and are difficult to remove without causing damage. Each specimen should be wrapped in tissue paper; glazed or grease-proof paper is unsatisfactory. If the packets do not completely fill the container add more tissue paper or cotton-wool so that the packets cannot move. See that the container is strong enough to bear handling by the Post Office officials without crushing; a tin or a strong cardboard or wooden box is recommended. I have received from abroad specimens in excellent relaxed condition embedded in fine sawdust impregnated with a solution of acetic acid and glycerine. Another way of sending fresh specimens is to pack them in tin boxes filled with shredded laurel leaves, which keeps the insects in a relaxed condition for four or five days.

2. HOW TO SEND PINNED SPECIMENS BY POST.

These are usually sent in a cork-lined wooden box. Single specimens may be pinned on the inside of the cork of a glass tube or pinned on a piece of cork securely fixed to the bottom of a tin; in the latter case the cork should be held in place by a couple of wire loops passed through the bottom of the tin and tied outside. It is important to make sure that every specimen is firmly fixed in the cork, for if one specimen becomes loose it will damage all the other specimens as

it rolls from side to side in the box. Specimens pinned on pith, polyporus, or celluloid should be separated from each other by ordinary pins inserted between them to prevent the swinging of the mount on its pin and consequent possible damage to the specimen and to its neighbours. A layer of wadding or cotton-wool on the floor of the box will catch such pins or insects as may come loose and minimize risk of damage. The box containing the flies should be enclosed in a larger box or wrapped in corrugated paper; the space between the box and its container should be packed with cotton-wool or paper shavings.

3. CHOICE OF PINS.

I prefer long, black ($1\frac{1}{2}$ ") steel continental pins because they can be handled with the fingers under the microscope; also one pin may bear several small specimens or a pair in copula. These pins never develop verdigris, which ruins so many specimens mounted on silvered pins.* I have been told that continental pins bend more easily than silvered pins; that has not been my experience; furthermore, should a continental pin be bent there is plenty of room to straighten it, whereas a silvered pin usually bends close to the specimen. It is important that the thickness of the pin should be related to the size of the specimen; too thin a pin allows the specimen to move on the pin; too thick a pin destroys too much of the thorax. For very small specimens I use minute (12.5 mm. \times .0056) steel pins.

4. HOW TO PIN THE SPECIMEN.

In the case of all large Nematocera (e.g., Daddy-long-legs) the pin can be inserted in the middle line at the base of the thorax or sideways through the pleura. In the case of small Nematocera (e.g., Gnats) the sideways pinning is best, except perhaps for Fungus-gnats, in which the pleura bear specific characters. Large specimens of other Families (e.g., Robber-flies, Gad-flies) can be pinned in the middle line at the base of the thorax, except Muscoid and Tachinid flies, which must be pinned on one side of the middle line of the thorax to avoid destroying bristles situated in the middle line; the number and position of these bristles is of use in determining the species. All small specimens can be mounted by inserting the point of a minute steel pin anywhere in the thorax; the other end of the pin is inserted in a mount of pith or polyporus carried on a strong ordinary pin, preferably a long one. Diptera should never be carded nor laid out on celluloid. Small specimens can be attached to the point of a triangular piece of card or celluloid by a speck of tragacanth mucilage provided at least one wing and the legs project beyond the edge of the mount so that they can be examined by transmitted light.

5. HOW TO DISPLAY THE SPECIMEN.

A setting-board is not necessary, the most that is needed being a small piece of thin cardboard or stiff paper. See that at least one wing is so situated that all the veins can be examined by transparent illumination. This desideratum is usually attained when the wing is more or less vertical above the body and in most cases the wings will remain in

*Real silver pins never develop verdigris.—J. E. C.

that position without extraneous support. It is unnecessary, and in many cases disadvantageous, to place the wings horizontally; in that position they render difficult the examination of the pleura. The legs should be extended, but should not be spread out horizontally because then they also interfere with the examination of the pleura. In some cases the legs will not remain extended without support; in such cases pass the pin through a small piece of card and let the legs rest on the card. In the case of some flies (e.g., Daddy-long-legs, Hover-flies) the abdomen is apt to hang down; in such cases the abdomen can be supported on a piece of card, or the box containing the freshly-set flies can be put upside down until the specimens are dry. The head is sometimes twisted on the neck; it can be returned to its normal position by means of a setting needle. Many small flies, and more especially those that bear scales on their wings (e.g., Mosquitoes, Moth-flies), should be mounted in the field as soon as they are caught. All other flies should be mounted either as soon as possible after death or 24 hours later, so as to avoid mounting them in a state of *rigor mortis*. Dried flies can be relaxed in the ordinary way but they never set as well as fresh ones.

6. DISPLAY OF MALE GENITALIA.

Lately the study of male genitalia has been used extensively in the determination of species, and in many genera (e.g., Daddy-long-legs, Gnats, Bluebottles, Flesh-flies) some species have been based exclusively on male genital characters, the females of these species being for the present indistinguishable. In most large flies the male genitalia can be drawn out by means of a setting needle and left *in situ*. In some of these flies (e.g., Flesh-flies) the genitalia after being set out are apt to contract again; in such cases the extended genitalia should be supported on a piece of card or kept extended by means of a pin around which the chitinized appendages can be hooked. In the case of the smaller flies the examination of the genitalia entails the use of a higher magnifying power and this cannot be employed when the genitalia are *in situ*; in such cases the end of the abdomen should be snipped off and the genitalia attached by means of tragacanth mucilage or Canada Balsam to a piece of card or celluloid mounted on the same pin as the fly. For the really detailed study of the genitalia microscopic preparations should be made by soaking the organs in 10% solution of caustic potash for 24 hours, washing in water and teasing out in a mountant. The most suitable mountant is gum chloral as it avoids the processes of dehydration and clearing. In flies of the following families it is sufficient to see that the legs do not prevent the examination of the male genitalia: Large Tipulidae, Asilidae, Empididae, Dolichopodidae. In flies of the following families the male genitalia should be drawn out but may be left *in situ*: Syrphidae, Tachinidae, Muscidae, Cordyluridae, Sciomyzidae, Trypetidae. In flies of the following families the male genitalia should be mounted separately: Mycetophilidae, Simuliidae, Chironomidae, Ceratopogonidae, and small Tipulidae. As far as I know systematists have not yet made use of male genital characters for the classification of flies in other families. One author makes use of them as adventitious aids in the Drosophilidae and I believe they would be found useful in other families.

7. STORAGE OF THE COLLECTION.

Continental pins need deeper containers than silvered pins. I have had no experience of drawers, but I believe that many of them will take continental pins. My collection of nearly 3000 species is contained in cartons (10"×7½"×2"). I find these cartons cheap, light, dust-proof, convenient for getting at the specimens, easily stacked on shelves like books, and when a carton overflows it is easy to slip another one between it and the next one. A small muslin bag containing naphthaline and paradichlorobenzene is pinned in a corner of the carton, and, if necessary, the floor of the carton can be sprayed with creosote or benzene; I have had no trouble with mites or mould.

8. LABELLING.

Since Verrall's list (1901), which is quite out of date, there is no label list of all the British Diptera; the labels must be handwritten and Indian ink should be used. Each fly should have, on its pin, a label indicating locality, name of captor, and date of capture. In the case of bred flies the name of the host (plant or animal) should be stated. If desired, a local collection can be designated within a general one by pinning a small coloured label alongside the locality labels of those flies that have been taken in the district concerned. By this means one can see at a glance what species of any family occur in that particular locality or district.

COLLECTING NOTES.

NOTES ON VARIATION FROM THE WORTHING MUSEUM COLLECTION (*Continued from p. 61*).—*P. cardui*.—There is no noticeable variation in the specimens here. There are two small ones from Palestine and one lighter in ground colour than usual from the Lido. The tone of the underside hindwings varies slightly; the darkest is from the S. Downs, the lightest from the Grande Chartreuse.

P. atalanta.—Here again there is no variation to speak of; there is a good example of ab. *fracta* from Guildford, and two others, not so good, from the S. Downs and the Sarnthal; one with the scarlet bands very slightly inclined towards orange comes from Charpigny in the Rhone Valley.

V. io.—This is but poorly represented from abroad, but there is no variation except in the size and the blueness or whiteness of the outer row of small spots on the upperside forewing; this is quite independent of locality.

A. urticae.—This is more variable but only in minor points. The size of the two black spots near the border varies greatly even in specimens from the same locality. The lower is generally larger, often much larger than the upper one. The general appearance of the upperside varies a good deal, chiefly dependent on the size of the black blotch on the inner margin. The specimens also vary a good deal in size. There is a very large one from Oberbozen in the Tyrol, and another nearly as large from Mt. Revard, from which also comes one of the smallest. A bred specimen from Samoussy has the band on the hindwing almost colourless. From Corsica there is one large specimen of the race *ichnusa*,

and half-a-dozen tiny ones, very bright and perfect. These were bred from ova sent to me by Miss Fountaine, and their size may be due to their having been "brought up" at Bérissal. There is a good series of rather dark specimens from Narvik, but they are not of the *polaris* form; the first blotch on the costa does not join the central one, except on the underside, though it nearly does so in a few cases.

E. antiopa.—Nearly all the specimens are Swiss; the hybernated specimens have generally white borders, but one has a yellow border though not bright. There are two quite small specimens from Gavarnie and a hybernated one from Aix-les-Bains with a white border.

E. polychloros.—There are unfortunately no English specimens. There is a Swiss series consisting partly of specimens bred from larvae found at Bouveret and partly of others caught in the Jura, where it is often common; one from Digne, two rather large ones from Salonica, and a series from Sarnthal in the Tyrol, where it is common; also a few large and very bright examples of the *erythromelas* race from Algeria.

P. c-album.—This is as usual very variable. It is now the commonest of the *Vanessidae* along this part of the S. coast except *A. urticae*. All the English specimens are dark on the underside, but they are all late summer or early autumn ones; the uppersides are also dark except two from the S. Downs which are lighter. All the foreign ones, from France, Switzerland, Italy and the Tyrol, are lighter on the upperside than the English ones, though a few from Digne are rather darker than the others. The undersides vary greatly, indeed there are no two alike. Rhone Valley specimens taken at the end of June and the beginning of July are all light, but varying greatly in shade, but the spring specimens are dark. Those from the Tyrol are rather large, especially one ♀, but the undersides vary from almost unicolorous dark to rather light and variably marked, though all were taken within two or three days at the end of June.

L. sibilla=*camilla*.—There is very little variation in size and none at all in other respects. The specimens are from the New Forest, one from Balham, others from Samoussy, the Rhone Valley, the Jura, Mendrisio (Tessin) and the Tyrol.

A. iris.—Except one from Aix-les-Bains all the specimens are from Switzerland, where it is not uncommon in the Rhone Valley and swarms in the Jura. The Valley specimens are all from Aigle except one ♀ from Villeneuve; there is another ♀ from Eclépens and a very fine one from the Bavois road a little higher up. There is a row of specimens transitional to ab. *iole*, including one ♀, in all of which the white has nearly disappeared from the forewings and is very narrow and shortened in the hindwings; there are also five magnificent specimens of ab. *iole* entirely black on the upperside, and with the chocolate colour entirely replacing the white on the underside of the hindwing. Among the transitional forms one underside has the white band on the hindwing entirely replaced by blue-grey. There were several of this form in the collection of the late Mr Fison of Charpigny. These are all from Eclépens or the Bavois road.

P. megära.—Three generations are represented here from England, France, Italy, and Greece. Among the English specimens is a good ♀ of the ab. *mediolugens*, in which the space between the two black lines

across the centre of the upper wing is filled in with dark colour. This was taken at Guildford in May 1918; in the same year in July another was taken at Guildford and a third on the N. Downs in which this band was much suffused with dark colour. It is a curious fact that all 3 examples of this rare aberration occurred in the same year and in the same locality though in different broods. There are examples of the ab. *alberti* (with extra eyespots on the upperside forewing) from Switzerland, both ♂ and ♀. ♀s from S. France (Digne and the Riviera), also from Italy and the Swiss Rhone Valley and Ticino are considerably lighter than those from England; this is not the case with those from Greece. There are a few of the first brood and a good series of the second brood of the little *tigellinus* from Corsica.

P. aegeria.—All shades of ground colour are represented from the typical Algerian form (one specimen only), through *meone* from the French Riviera, Corsica and Ticino; *intermedia* from Italy (three generations), S. Switzerland, the Jura, France and the Channel Islands; *egerides* from N. France, Vernayaz (third generation), and England, to ab. *pallida* from the New Forest. The typical form shows clearly its relation to *megea* which is quite lost in its English form. The first brood examples are generally lighter than later ones, the contrast being greatest in English specimens. Those from Surrey and Sussex are specially light, the summer brood from Tavistock being specially dark. The New Forest ab. *pallida* were taken at the end of June and the beginning of July. The whole genus except *xiphia* from the Canaries and Madeira is represented, as we have eight specimens of *clymene* from Sarepta (all ♂s) and three of *roxelana* from Cyprus, including a ♀. *Hiera*, *achine*, and particularly *maera* are well represented.

H. semele.—The English specimens are the smallest except those from Finland, which are about the same size. They come from Wither Slack, Bude, the New Forest, and the N. and S. Downs. A ♀ from the S. Downs has an extra small spot between the two usual ones on the forewing; there is also one with a small spot and one with a largish one in the same position from Italy and one with a very large one from Aix-les-Bains. Italian specimens are all rather large, some from Bérisal rather larger, the finest of all from Digne. All these are brightly coloured. Those from the Tyrol are dark, those from the Pyrenees are rather pale and of medium size, those from Barcelonnette darker, as are those from Greece also of medium size. Finland examples, though as small as the English, are much more highly coloured, and also more strongly marked on the underside. There is a good series of *aristaeus* from Corsica. The race *algorica* only differs from the Digne specimens in being rather smaller and having a slightly brighter orange-brown tint in the ground colour; it seems hardly worth a special name. The race *mersina* from Cyprus is dark with much suppressed markings on the upperside.

A. hyperantus.—Although the first impression on looking at a drawer of this species is one of sameness, there is really considerable variation both in the spotting and in the ground colour of the underside. There are specimens from a considerable number of English localities and each of them seems (so far as these specimens are concerned) to have its own characteristics. All notes on spotting unless otherwise men-

tioned refer to the forewings. All the specimens from Bude but one have three spots on both surfaces; all the ♂s have dark undersides, the ♀s being lighter—one much lighter. The New Forest specimens generally show two spots, but one has three; there is no difference in the two sexes in the colour of the underside, which is not so dark as those from Bude. The Tavistock specimens are large—one ♀ very large; all show three spots; the ground colour of the underside is rather lighter than those from the New Forest. From the Chilterns all show two spots on the upperside and three on the under; the ground colour is the lightest of all the English specimens. Specimens from the Cotswolds are rather small; spots on the upperside are scarcely perceptible, one is quite without; there are three on the underside; but the lowest is wanting on one wing in one specimen. Wolford (S.W. Warwickshire) gives rather small and rather dark specimens, with two spots on the underside. There are two uppersides from Balcombe (Sussex) very dark, the ♂ showing no spots. To go to the foreign forms: from Belgium (Hockai) come rather small ♂s; the colour of the underside is dark, and alike in both sexes; the spots vary between two and three. From Switzerland there are examples from several localities. Those from the Jura scarcely show any sign of eye-spots on the upperside, on the underside the ♂s have two, the ♀s three. From the peat-bogs at Altmatt come the most remarkable specimens, ♂s rather small, one ♀ very large, and one quite small; the latter have the ground colour of the underside of a beautiful dead-gold colour on which the three spots show very conspicuously; the ♂s have generally two. The third spot in specimens from the Rhone Valley is very small. In ♂ mountain specimens from Caux spotting on the upperside is nearly or quite invisible; the ♀s are lighter and show two spots on both sides. Those from the Via Mala are rather large, with no spots on the upperside but two on the forewing on the underside; in two specimens the top spot and also the lowest are wanting on the hindwing; there is one ab. *caeca* (a form usually though incorrectly called *arete*). From Luan in the Vaudois Alps come four examples of this form and also one approaching *arete*, of which there is no actual example here. Those from France all come with one exception from near Aix-les-Bains; the ♂s show no spots on the upper side but have two on the underside. The ♀s have three on the upperside which show very clearly, but only two on the underside. They are all large and dark, but the underside of the ♀ is lighter than that of the ♂s. There is one ab. *caeca*. The only exception as to locality is a perfectly unmarked ab. *obsoleta* from the Grande Chartreuse.

From Italy there are specimens from Fondo Töce (Pallanza). They are very large and dark; the ♂s have three spots on the upperside and two on the under; the ♀s two or three on the upper and three on the underside; they have a tinge of the old-gold colour of the Altmatt specimens, and slightly lanceolate spots. Specimens from Hinterzarten (Black Forest) are rather small and dull, the ♂ with two spots on the upper and undersides, the ♀s with three on the underside on a very pale ground with a yellowish (not golden) tinge. From the Tyrol come specimens large and dark with two very indistinct spots on the forewings of the ♂. From Finland (where it is very common) come small specimens dark on the upper but light on the underside; the number and visibility of the spots varies. There are slightly lanceolate speci-

mens from England and the Rhone Valley.—Rev. G. WHEELER, M.A., F.R.E.S.

COLIAS CROCEUS, FOURC., VAR. *HELICE*, HB., NEAR CARLISLE.—Referring to my notes on *C. croceus* in the Carlisle district last autumn in the October number of this magazine, p. 109, an example of the var. *helice* has just been brought into the Museum here, which was taken by Mr W. B. Redmayne on 17th September last at Dalston, about four miles from Carlisle. The capture is of particular interest as we have no previous records of *helice* for Cumberland. The specimen is somewhat worn and has the appearance of having come from a distance. On the other hand, however, most of the typical *croceus* taken here were in fine condition and were probably bred locally.—F. H. DAY, 26 Currock Road, Carlisle, May 6th, 1942.

SOME TRYPETIDAE FROM THE STROUD DISTRICT OF GLOUCESTERSHIRE.—For two years in succession Mr T. Bainbrigge Fletcher, although not specializing in Diptera, has been good enough to send me such Trypetids as he has captured or bred. He tells me he knows of but few records of this group of flies from his district, and suggests that publication of the names of those he has taken, together with such records from *Audcent's "Bristol Insect Fauna" as come within a five-mile radius of Stroud, may lead to the recording of further species. The fact that of the two lots he has sent me of six species each, only one is common to both, points to the probability of a number of other species occurring in this district. The paucity of Dipterists and the reluctance many seem to have to publishing records of their captures is the probable reason that so few have so far been recorded.

In the following list Audcent's localities are marked with an asterisk, and where generic or specific names differ from those in Verrall's "List of British Diptera," the latter are given in brackets.

Euribia (Urophora) stylata, F.—Rodborough, 4.vii.40: 3.vii.41.

Phagocarpus permundus, Harris (*Anomoea antica*, W.).—Rodborough, bred from hawthorn berries, 2.vi.36.

Acidia cognata, Wied.—Rodborough, 22.ix.33: 7.ix.35.

Philophylla (Acidia) heraclei, L.—Rodborough, 29.v.40: *fairly common in Glos.

Myolia caesio, Harris (*Acidia lychnidis*, Fab.).—Rodborough, 12.vii.33: *Painswick.

Terellia (Trypeta) serratulae, L.—Rodborough, 13.vii.40.

Orellia cylindrica, R.-D. (*Trypeta onotrophes*, Lw.).—*Selsley.

Orellia (Trypeta) tussilaginis, F.—Rodborough, bred from *Arctium lappa* seeds, 1938.

Xyphosia (Tephritis) miliaria, Schrk.—Selsley, 26.vii.39. *Common in Glos.

Tephritis bardanae, Schrk.—Rodborough, 3.vii.40: Whiteshill, bred from *A. lappa* seeds: *Painswick, *Sheepscombe.

Tephritis (Urellia) cometa, Lw.—*Painswick.

Tephritis vespertina, Lw.—Rodborough. *Common in Glos.

Ditricha (Carphotricha) guttularis, Mg.—Rodborough, 14.vii.39.

*Audcent, H. "Bristol Insect Fauna: Diptera, Pt. vi" (*Proc. Bristol Nat. Soc. and S.*, Vol. vii, Pt. vi, pp. 436-437, 1933).

Noëta (*Carphotricha*) *pupillata*, Fall.—*Painswick, 3.vi.1890.—H. W. Andrews, F.R.E.S.

EXTRACTS FROM MY DIARIES.—The following notes may be of some small interest here and there. Many of the observations are very immature as the extracts cover the years from 1930 to 1935 and I was still at school in 1930. I have, however, taken them in the exact form in which they were entered at the time as I feel this to be preferable. I have only taken items which are not usually dealt with in text-books and which might appear to be a little out of the ordinary run of observations. Ordinary times of appearance and so on I have ignored as they are usually well covered. These notes might provide confirmation of other people's observations or suggest something useful.

January-March.—January 7th, 1930. [Pebworth, Wores.] Went searching for hibernating insects . . . a beautiful "Comma" in a pigsty with variegated underside, not plain. I read that the spring insects (i.e. hibernated August ones?) have plain undersides. This definitely had not.

January 17th, 1931. [Nr. Pebworth.] Went pupa-digging to Dorsington. Two small pupae on the last tree—a willow. In a little hole filled with grass, moss, etc., we found a hibernating bee—a little brown and yellow fellow with black legs, some sort of "solitary bee;" we put him back but he came out before we left, but will probably go back again; it was on the north side of the willow, about 2 feet up.

January 18th, 1931. [Pebworth.] *L. quercus* larvae are eating bramble pretty well now.

April 6th, 1930. [Pebworth.] Searched trunks, etc. Found two dead ichneumonid Lime Hawk chrysalids under bark on an elm (the roots were in water in a ditch). Dropped the bark and looking for the old pupa case found a live one lying on the ground.

6th, 1931. [Nr. Bromsgrove.] Went to Trench Wood . . . an old Puss Moth cocoon on an oak trunk.

10th, 1931. [Pebworth.] Turned into a lovely day, a lot of *G. rhamni* out, *urticae* and *c-album*; *c-album* slightly torn, very tame, ordinary variegated (not green) underside—he sat on my finger.

2nd, 1932. [Pebworth.] *C. verbasci* are quite safe to leave over their first night after emerging—they stir very little. *P. strataria* should not be left.

4th, 1932. [Newquay, N. Cornwall.] Found 15 *E. lichenea* larvae where we found some last year; all on the same bit of wall, all sizes, some small and some very large.

7th, 1932. [Newquay.] Some—or one—of my *H. prasinana* pupae keep on wriggling about in their cocoons and making an awful noise. I hear them nearly every time I go near them, at all times of the day or night. I have not seen this noted before.

9th, 1932. [Newquay.] 2 *H. prasinana* hatched this morning, one very badly crippled. 2 more in the afternoon.

18th, 1932. [Newquay.] Spent the morning on the sandhills collecting *L. littoralis* larvae by scraping the dry sand with my hand

which runs down and exposes them; the larvae were smaller at the inland side of the sandhills. On the hillside there were quite a number of *V. io* and occasionally they would dart up after low flying Swallows, apparently mistaking them for other *V. io*. After tea we went to get **Sesia muscaeformis* larvae and after some time found them. They were on the inland side only of the walls, on the cliff tops, not facing the sea as one would expect, considering they are only supposed to feed where the sea spray catches them.

19th, 1933. [Pebworth.] . . . only two pupae of *P. unifasciata* off *Bartsia* could be found in breeding cases. This species and *E. pimpinellata* make tolerably secure cocoons of silk and earth. One *E. pimpinellata* spun the leaves of the *Pimpinella* together as it had no earth. I see Scorer says *pimpinellata* pupates "in the seed-heads," while Wilson says "in an earthen cocoon" which is correct?

28th, 1935. Near Moreton-in-the-Marsh found four *Polyplocaridens* in an oak wood. They seem to favour ordinary largish trees, in open woodland but not in clearings, south-western side, 4 to 5 feet up. Mostly just in a crevice but one partly under some lichen.

May 28th, 1932. [Hunts.] After long beating got one *S. pruni* larva. Then tried searching and soon discovered 6 *S. pruni* and 4 *betulae* larvae, the *betulae* very tiny.

20th, 1933. [Oxfordshire.] There were quantities of *M. hastata* all over the wood—they sat on the wet muddy patches in the centre of the wood; they fly almost like butterflies and sit on the wet mud fanning their wings.

June 24th, 1930. [Bromsgrove.] Caught a moth in School House. I had it in a pill box in the Maths. hour and observed the vibrations of its palpi; they seemed to correspond to a breathing movement in pace, alternately moving to left and right. Sometimes the left or right one moved twice in succession though, instead of alternately. I took two observations. The first of 12 vibrations to left and right, and in these the left palpus moved twice in succession on one occasion only; the second of 26 vibrations to left and right, and in these the left palpus moved twice in succession on three occasions and the right palpus did the same thing on one occasion. It used its antennae extensively for finding its way about the box. It was some kind of *Noctua*.

27th, 1932. [Pebworth.] Early in the evening *P. gamma* seems to fly generally all over the garden but later, when it gets dark, it is pretty well confined to Valerian, with an occasional one at Catmint and Delphinium.

7th, 1935. [Kent.] Just at dusk I got two of the white *carpophaga* at *Silene* flowers, but later on they did not fly and I got over a dozen at rest on the flowers.

23rd, 1935. [Worcestershire.] At Trench Woods I found ants crossing a path in a constant stream about eight inches wide and six feet long—there were so many that I stood about two paces away and I could plainly hear them rustling in the dry grass.

26th, 1935. [Pebworth.] A most interesting item—on our Scots Firs in the evening a few minutes before nine there were two pairs

of Crossbills. We got the glasses and watched them. The male had a rosy breast but not quite so bright as the figure in Coward's *Birds of the British Isles*. We watched them for a quarter of an hour; they were quite unafraid, hanging upside down and feeding over our heads, showering the cones down, and we left them there.

July 1st, 1935. [Pebworth.] Sugared. There seems to be another emergence of *exclamationis* and I took some nice ones again (June 24th, 1935, *exclamationis* getting worn and going off at sugar).

August 24th, 1932. [Glos.] On the Cotswolds I saw a great number of insects were covered with those red mites—larval Trombidiids—and I saw them on the following species:—*E. ianira*, *L. icarus*, *P. gamma*. They were very common on *icarus*.

September 15th, 1930. [Pebworth.] By now all the *N. typhae* have hatched. 6 ♂♂, 14 ♀♀. All hatched in the evening, only 1 cripple. Their wings dry very quickly indeed.

28th, 1930. [Pebworth.] I don't know whether the Pale Tussock larva gives a rash but I notice it always turns the hairs in the direction of an object that touches it.

18th, 1935. [N. Wales.] Saw a Dipteron sheltering in shocking weather in an old cocoon of *Cimbex lutea*.

October, November, December 1931. [Pebworth.] I noticed this year, rearing *Nudaria mundana* larvae, that they ate the portions of old pupa cases of *M. aurinia* left in the same cage.—P. SIVITER SMITH, Little Aston Park, Streetly, Staffs.

A STRANGE STORY.—Early in March the Keeper of Entomology submitted three beetles to me for names, which had been sent to him by a doctor at the Royal Cancer Hospital. In a letter accompanying them he stated that a patient had complained that she frequently passed insects in her urine, and that the enclosed were specimens in question. The beetles proved to be two specimens of *Atheta longiscula*, Gr., and one of *Stilicis affinis*, Er. These are both common species found at the roots of grass, in vegetable refuse, rotting wood, etc. It is, of course, impossible that they could in any case get into a person's bladder; but at the time they would normally have been in hibernation, especially as the weather had been very cold. The point that struck me most was where did the beetles come from? They would not be out walking, or flying about, and it would require an expert Coleopterist to find them under the then existing weather conditions.—HORACE DONISTHORPE.

[This seems to be closely related to the well-known story of the vomit of the "Three Black Crows."—HY. J. T.]

NOTES ON THE ABOVE "STRANGE STORY."—Authentic cases of urinary Scarabiasis are rare but at least one has been recorded by Archibald in the Sudan, where beetle larvae (of an undetermined species) occurred in the bladder of a native who suffered from debility and painful micturition with haematuria, as noted by Patton and Evans (*Insects . . . of Medical . . . Importance*, Part I, p. 675, 1929). Intestinal (sometimes only rectal) Scarabiasis is not uncommon in warm damp districts in Ceylon and India—see, for example, R. A. Senior-White and S. K. Sen in *Report of Fourth Entl. Meeting, Pusa*, 1921, pp. 236-239; M. O. T. Iyengar, *Report of Fifth Entl. Meeting, Pusa*, 1923, pp. 201-202, t. 15;

T. Bainbrigg Fletcher, *Ind. Med. Gazette*, LIX, 296-297 (vi, 1924)—but in all these cases only adult beetles of the sub-family Coprinae of the Scarabaeidae have been concerned. The actual occurrence of the beetles in the intestines has been authenticated in several cases; but, on the other hand, cases have occurred in which the patient, either for purposes of malingering or of exciting special medical attention, has deliberately introduced the beetles into the excreta. The case quoted by Mr Donisthorpe is unusual from the occurrence at the same time of more than one species of beetle, a fact which seems *primâ facie* improbable, so that one asks oneself whether these beetles were really passed, as stated, or merely attracted to the vessel containing the excreted urine.—T.B.F.

BLEACHED MANIOLA JURTINA, L.—The experience of Mr J. F. Bird in taking largely male specimens of bleached *M. jurtina* [*Ent. Rec.*, liv, p. 24, March 1942] is opposite to mine. I have taken seven altogether, one male and six females. Some of the females are very fine and in two cases on the usual fulvous patch which has become white there are so few scales that the wing there is transparent. One female comes from Forres, the others from Pebworth, Worcs., and the male from Trench Woods, Worcs. They were taken in wet seasons and I believe this to be the cause of the bleaching.—P. SIVITER SMITH, Little Aston Park, Streetly, Staffs.

CURRENT NOTES.

The Irish Naturalists' Journal for March contains a List of Additions and Corrections to the recently published Records of the Microlepidoptera of Ireland by Dr Bryan P. Beirne. In the same magazine we have records of several *Manduca (Acherontia) atropos* being seen or captured, one as early as 29th April 1940. The localities were Kildare, Belfast, Dublin, Londonderry. *Colias croceus* was also reported from near Dublin and Co. Down, etc., from June to October. The butterflies in the Valley of the River Barrow in 1941 were *L. sinapis*, *E. cardamines*, *C. croceus*, and var. *helice*, *G. rhamni*, *V. atalanta*, *V. io*, *P. cardui*, *P. icarus* (1), *L. minima*, but *T. quercus*, usually present, was not seen.

WICKEN FEN FUND.—This fund is raised annually by entomologists and other nature-lovers to assist in defraying the expenses incurred by the custodians of Wicken Fen (the National Trust), in administering the Fen, preserving the fauna and flora, and in providing a watcher. The Fen is unfortunately very inadequately endowed, and its maintenance places a severe strain on the resources of the custodians, who for many years have had to contribute a considerable sum of money annually towards its upkeep. It is earnestly hoped, therefore, that every nature-lover who possibly can will contribute towards this very desirable object, and will send his or her contribution as soon as possible to the Hon. Treasurer, H. M. Edelsten, Bramble Hill, Balcombe, Haywards Heath, Sussex, who will be pleased to send permits for observation or collecting to subscribers on application. The amount of the fund in 1941 was £67 17s 6d.

a wide band." Tutt considered *subflava* as the var. *ferruginago*, Hb. of oo, L.

Warr.-Stz., *Pal. Noct.*, III, 233 (1910), did not place *subflava*, Evrs., to oo, but under *citrago*, p. 156, with the remarks "has quite a different appearance (from *citrago*), the three lines, inner, outer and submarginal, being accompanied by brown bands of uniform width, the stigmata marked with brown, and the hindwings with brown veins and terminal border."

Draudt-Stz., *Pal. Noct. Supp.*, III, 154 (1934), plt. 19e, under *citrago* illustrated *subflava*, Evers., "apparently a very rare form" (Warren had said that it occurred in Denmark, the Baltic, St Petersburg, the Urals and in Asia, p. 154). The figure Draudt gave is of quite a different shape and colour from *citrago*. The bands are uniform in width and the whole is symmetrical on the lines comparable with those of *citrago* and thus cannot agree with the description of the pattern given by Eversmann.

The accounts, etc., of this form are very unsatisfactory and confused. Culot, *N. et G.*, plt. 54, has figured it under *citrago*; the shape and colour are possibly a *citrago*, but in no way does it resemble the *subflava* of Draudt in Seitz's plate or of the description of Eversmann.

I think *subflava*, Evers., should be dealt with under oo as Evers. did at first and which Tutt, following Stdgr., took as correct in his *Br. Noct.* In his work on the Noctuae Evers. did not put *subflava* under *citrago* but only suggested that it might be a variety of that species.

NOTE.—In dealing with *citrago*, I did not go thoroughly into this question. There are, to judge from the figures of Seitz (Drdt.) and of Culot, two diametrically opposed conceptions of *subflava*, Evers.

ab. *sulphurea*, Stdgr., *Cat. Lep. Pal.*, 203 (1901).

ORIG. DESCIP.—"Al. ant. unicoloribus sulphureis, saepius ciliis brunneo-variegatis."

Hamp., *Cat. Lep. Ph.*, IX, 234 (1910). "Forewing nearly uniformly pale yellow."

ab. *maculifera*, Stdgr., *Iris*, IV, 299 (1891). [Listed on p. (56) in error.]

ab. *griseago*, Schultz, *Soc. Ent.*, XX, 3 (1906-7).

ORIG. DESCIP.—"The examples lying before me of this new aberration show the greater portion of the forewings darkened; the subterminal band, the middle band and the basal shade are suffused together into a large dark area, in which the yellow orbicular and reniform stigmata stand out clearly. In a few transitional forms the middle area is almost wholly devoid of the darkening."

"Yet so far as the colour is concerned, this aberration standing in a series shows itself essentially as a variant from specimens of ab. *renago*, Haw. The strongly emphasized dark shaded markings, which in ab. *renago* are coloured brown-red or blackish-brown (Stdgr.-Reb. "fuscis") show here a distinctive grey colour (dark grey), which occasionally is equivalent to a light ashy-grey. Also the ground colour of the forewings is often paler (yellowish-white) than in the typical form."

"I name these forms with reference to the grey colour of the forewings ab. *griseago*. They were bred from eggs obtained in Silesia, with forms of ab. *renago*."

ab. *conflua*, Holze, *Int. Ent. Zt.*, XV, 79 (1921).

ORIG. DESCRIP.—"Two ♀ specimens which diverge from the normal form, in that the orbicular and reniform stigmata are confluent. Normally there is a completely recognizable space between them." Magdeburg.

ab. *rufocanago*, Dnhl., *Ent. Zeits.*, XXXIX, 184 (1926).

ORIG. DESCRIP.—"The commonest form is one in which the rust-coloured darkenings on the outer area are suffused olive-grey. This form does not fall under the very rare *griseago*, Schultz, but one in which the rust-red grey scaling is generally spread, very intimately mixed, and is thus the darkest extreme and the most variegated *Dicycla*, the mixture of *renago* and *griseago*, and is thus to be treated entirely as a colour variant ab. *rufocanago* (canus = grey)." S. Tyrol, Terlan, Sigmundskron, Lana.

ab. *olivacea*, Skala (reported in Seitz, *Noct. Supp.*, III, 190 (1935), without reference).

DESCRIP.—"Is an aberration that is completely suffused with olive-grey." Moravia. This form, not *rufocanago*, Dnhl., is the darkest, as it is "completely" suffused with olive-grey.

Cosmia, Ochs. & Treit. (1816-25), Dup., *Stdgr.*, Splr., South, Culot [*Caradrina*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Enargia*, Hb. (1800-3), Hamp., Warr.-Stz.: *Euperia*, Gn. (1841-1852), Barr.] *fulvago*, Hb. (1800-3), *paleacea*, Esp. (1788-?).

Tutt, *Brit. Noct.*, III, 19 (1892): Meyr., *Hand.*, 118 (1895): Barr., *Lep. Br. Is.*, V, 308, plt. 223, 2 (1899): *Stdgr.*, *Cat.*, IIIed., 204 (1901): Splr., *Schmett. Eur.*, I, 245, plt. 45, 26 (1906): South, *M.B.I.*, II, 5, plt. 4, 1 (1908): Hamp., *Lep. Phal.*, IX, 238 (1910): Warr.-Stg., *Pal. Noct.*, III, 233, plt. 47 l (1911): Meyr., *Rev. Hand.*, 72 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 191 (1935).

Ernst. & Engram., *Pap. d'Europ*, VII, 170, figs. 526 a, b, c, d (1790), gave 4 figures of this species, one (d) an underside, one (c) a very strongly marked female, (b) was a markingless female, and (a) a normal male. They said it was the *paleacea*, Esp.

Bork., *Naturg.*, IV, 683 (1792), placed *paleacea*, Esp., IV, 323, plt. 122, 3-4, as ♂ and ♀ of *gilvago*, Schiff. f. 3, ♂. f. 4, a var. of ♀.

Hb., *Samml. Noct.*, 198-9 (1800-3), gave 2 very good well marked figures; the second figure was an extremely large specimen, both under the name *fulvago*.

Treit., *Schmett.*, V (2), 380 (1825), who treated this species under the name *fulvago*, Hb., held the *gilvago* of Bork. as a synonym, as well as the *fulvago* of the *Verz.*, p. 86, S.1. Werneburg, *Beitr.*, I, 422, concurs in this last as being the *paleacea* of Esp.

Dup., *Hist. Nat.*, VII (1), 125, plt. 109, 1 (1827), gave a good figure under the name *fulvago*, Hb. (nec L.).

Steph., *Ill.*, III, 62 (1829), and Wood, *Ind. Ent.*, 64, f. 344 (1834), dealt with this species under the name *fulvago*. The latter with a good figure.

H.-S., *Bearb. Noct.*, II, 223 (1849), called this species *fulvago*, WV., and said it was the *paleacea*, Esp., and *gilvago*, Bork. He also noted that the waved line in Hb. 198 was too bold and the hindwings too white.

Gn., *Hist. Nat. Noct.*, VI, 6 (1852), dealt with this species under the name *fulvago*, Schiff. He included *paleacea*, Esp.; *gilvago*, Bork., and *angulago*, Haw. (?), and described a var. A, which Tutt subsequently stated was the *angulago*, Haw.

Guen., *Hist. Nat.*, VI, 6 (1852), considered *paleacea*, Esp., as a form of *fulvago* and referred to Engram., f. 526 b. He gave var. A a bright yellow form, with deep ferruginous marking.

Splr., *Schm. Eur.*, I, 245, plt. 45, f. 26 (1906), gave a good figure. He recognized ab. *angulago*, Haw., and ab. *teichi*, Krul.

South, *M.B.I.*, II, 5, plt. 4, 1 (1908), gave a good figure.

Stdgr., *Cat.*, IIIed. (1901), p. 204, treated *fulvago*, Hb., and *infumata*, Grote (Amer.), as synonyms. The only form noted was *teichi*, Krul. = *fusca*, Schultz (Russian).

Culot, *N. et G.*, I (2), 72, plt. 52, f. 2 (1914), a very good figure. He refers to ab. *teichi*, Krul., which is partly suffused reddish-brown.

Warr.-Stz., *Pal. Noct.*, III, 233, plt. 47 l (1911), treated the *fulvago*, Hb. (198), as a synonym. He gave 3 good figures, ♂ and ♀ *paleacea*, and ab. *teichi*, Krul., with considerable suffusion of reddish-grey or brown. He recognized the *angulago*, Haw.

Barrett described the Variation as follows:—

Principally variable in the distinctness of the markings, which usually are faint and often partially obliterated or even very nearly totally so. In occasional specimens the costa toward the apex is tinged with smoky colour which more rarely extends to the hind marginal cilia.

He records specimens "in which the ground colour is a warm buff or yellow-brown, irrorated with fuscous scales, the stigmata orange coloured; the central shade fuscous and broken into blotches, and the hindwings banded with fuscous towards the hind margin."

The *infumata*, Grote, of N. America, has been allotted to this species. Smith in his *Cat. Noct. N. Am.*, p. 14 (1893), lists it as such, but Warr.-Seitz does not mention the connection. Dyar, *Cat. N.A. Lep.*, No. 2217, includes it as a synonym of the American *discolor*, Wlkr.

With Hb., plt. 198-9, and Esp., plt. 122, f. 3-4, before me, I do not agree with Tutt's statement that "The *fulvago*, Hb., is identical with Esper's type." In Esp. both sexes are of uniform pale ground, the ♂ with 2 irregular dark red-brown transverse lines, 2 black discal dots below the orbicular, a pre-apical blotch, a row of marginal dots, badly drawn stigmata (2), and an abortive fascia on the inner margin. The ♀ has suppressed stigmata (2), one outer transverse line, the submarginal black dots and one dot below the orbicular. The shape, direction, number and colour of these features in Hb. do not agree with Esp.

The Names and Forms to be considered are:—

paleacea, Esp. (1788-?), *Abbild.*, IV, 323, plt. 122, 3-4.

fulvago, Hb. (1800-3), *Samt. Noct.*, 198-9, nec Linn.

f. *angulago*, Haw. (1809), *Lep. Brit.*, 239.

? *infumata*, Grote (1874), *Bull. Buff. S.*, II, 160. American sp.

ab. *teichi*, Krul. (1893), *Bull. Mosc.*, 81.

ab. *fusca*, Schultz (1899), *Soc. Ent.*, xiv, 139.

ab. *postulkae*, Skala (1929), *Ent. Zeit.*, XLII, 317 [(1934) *Drdt.-Stz.*, *Pal. Noct. Supp.*, III, 191].

Tutt dealt with: (1) the typical pale yellow ♂ and the brighter orange ♀; (2) dark rich orange form, *angulago*, Haw.; (3) the *fulvago* of Hb. Tutt stated "identical with the type," but certainly it is not so. See ante.

ab. or race *teichi*, Krul., *Bull. Mosc.*, 81 (1893).

ORIG. DESCRIP.—"Spatio medio alarum anticarum rubrescenti vel fusciscenti."

Of this Oscar Schultz in 1899 said: "The diagnosis for ab. *teichi*, Kroulik, is 'spatio medio alarum anticarum fusciscenti vel rubrescenti,' that for ab. *fusca* 'spatio medio et exteriore alarum anticarum fusciscentibus (vel rubrescentibus); alis posticis nigrescentibus.' I consider ab. *teichi* as only an intergrade of a form of which ab. *fusca* is the extreme development."—*O.S.*, p. 166.

Hamp.; *Cat. Lep. Ph.*, IX, 238 (1910), described it: "Forewing with the medial and terminal areas tinged with fuscous."

ab. *fusca*, Schultz, *Soc. Ent.*, XIV, 139 (1899).

ORIG. DESCRIP.—"The marking of the wings is the same as one finds in typical specimens. The individual and striking distinction is that deep brown overspreads a great part of the forewing. The whole area between the middleshade and the hind transverse line appears filled in of a deep brown (sometimes deep red) colour, which in one example lying before me invades also the whole outermarginal area of the forewing, and thus covers about two-thirds of the wing. In three of the specimens the deep brown colour comes out darkest in the middle of the inner marginal area. As regards the hindwings, which in other specimens are straw-yellow coloured, these examples show broad darker grey coloration towards the base. They were caught at Chodan in Bohemia in 1899."—Oscar Schultz.

ab. *postulkae*, Skala (1929), *Ent. Zts.*, XLII, 317 [*Drdt.-Stz.*, *Pal. Noct. Supp.*, III, 191].

DESCRIP.—"A unicoloured pale yellow form without any markings."

Plastenis, Bdv. (1840), Dup., Splr., Sth., Culot [*Cymatophora*, Ochs. & Treit. (1816-25), Frr.: *Caradrina*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Tethea*, Ochs. & Tr. (1816-25), Wood, Gn., Barr.: *Ipimorpha*, Hb. (1821), Hamp., Warr.-Stz.] *retusa*, L. (1761).

Tutt, *Brit. Noct.*, II, 19 (1892): Meyr., *Handb.*, 118 (1895): Barr., *Lep. Br. Is.*, V, 330, plt. 226, 1 (1899): Stdgr., *Cat.*, IIIed., 205 (1901):

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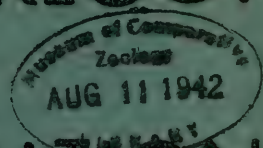
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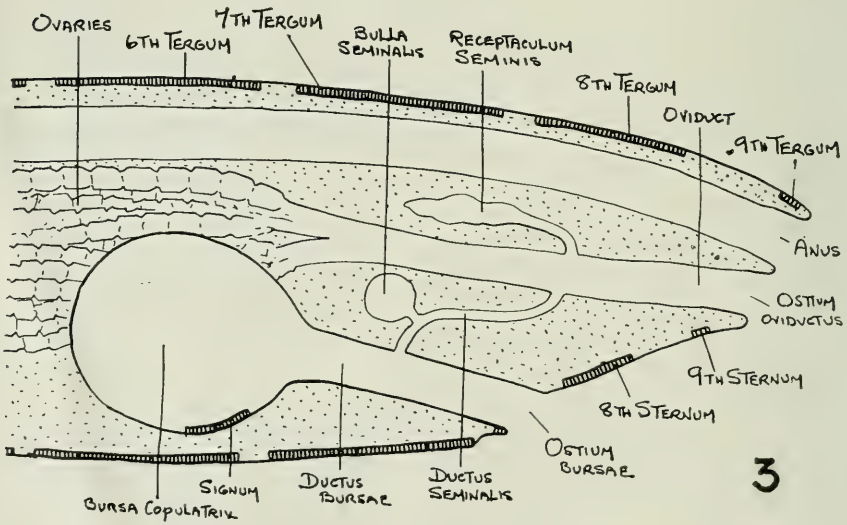
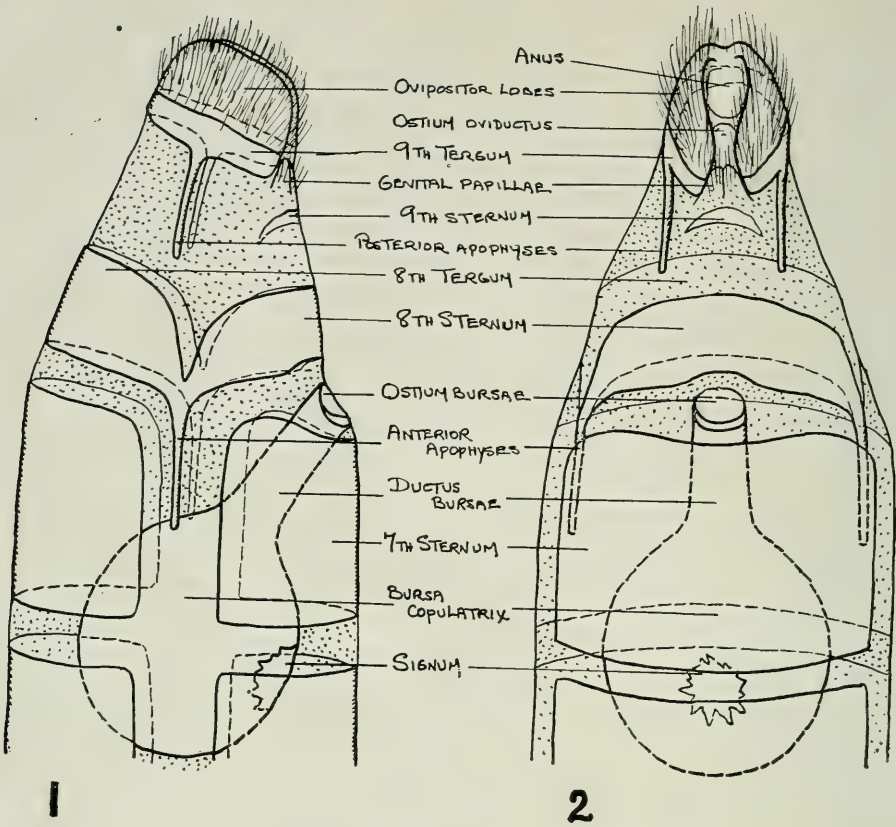
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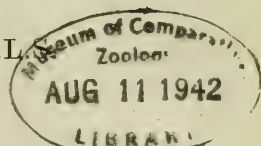


THE MORPHOLOGY OF THE FEMALE GENITALIA OF THE LEPIDOPTERA.

By BRYAN P. BEIRNE, Ph.D., F.R.E.S., F.L.S.

13,820

(Plate IV.)



In the following the name used for a particular structure is the name which has been used for that structure by the majority of writers who have applied a name to it.

In most Lepidoptera there are two genital openings in the female. One, the *ostium oviductus* or opening of the oviduct, is situated at the end of the body below the anus, while the other, the *ostium bursae* or opening of the ductus bursae, is situated on the eighth segment in the mid-ventral line. Some of the more primitive groups (e.g. Hepialidae, Nepticulidae) have a single sex opening at the end of the body; this is the common opening of the ductus bursae and oviduct. While the modifications of the male genitalia are apparently solely concerned with copulation, the female genitalia are modified for oviposition as well and these modifications are often stronger than those which have to do with copulation. Modifications of the body segments in the region of the ostium bursae have to do with copulation, while modifications of the apical segments have to do with oviposition. In systematic work part of the internal female genitalia is studied as well as the external, and while most of the internal structures are lost in the preparation of mounts from dried specimens the ductus bursae and bursa copulatrix, which are stronger and thicker than the other structures, are preserved.

The eleventh and twelfth segments are not visible in adult Lepidoptera.

THE TENTH SEGMENT.—In Lepidoptera the tenth sternum is represented by a pair of large, hairy lobes, the *ovipositor lobes*, which are situated at the extreme apex of the abdomen, one on either side of the anal and oviducal openings but separated ventrally by the genital papillae. That they represent the tenth tergum was shown by Kusnezov (*Rev. Russe. Ent.*, 1917: 151) who, from a study of the genitalia of a number of gynandromorphs, demonstrated that they are homologous with the uncus in the male. They are always large and well developed and are usually more or less membranous, but in some species they are sclerotized and may have cutting or saw edges for making incisions in plants in which the eggs are laid. In most Lepidoptera their bases are attached to the posterior margin of the ninth tergum.

THE NINTH SEGMENT.—In the lower Lepidoptera (e.g. Nepticulidae) and a few of the higher forms (e.g. *Gluphisia crenata*, *Phalera bucephala*) the tergum and sternum of this segment form a complete ring around the abdomen between, and quite distinct from, the sclerites of the eighth segment and the ovipositor lobes, but in most higher forms they become very much reduced, the sternum usually being unsclerotized while the tergum is usually fused to the ovipositor lobes and may become divided down the mid-line. On either side the anterior edge of the tergum is produced as a strongly sclerotized rod which serves for the attachment of muscles and for the stiffening of the abdomen when it is extended; these rods are the *posterior apophyses* and are best developed in species which lay their eggs in crevices (e.g. Cossidae) or

which have the ovipositor lobes modified as a cutting or sawing apparatus, but they are usually very short or quite absent in species which drop their eggs on the ground while in flight (e.g. *Hepialidae*). Incidentally, the structure of the tenth (uncus) and ninth (tegumen) terga in certain male *Danaidae* (e.g. *Anosia chrysippus*) is very similar to the typical structure of these terga in female *Lepidoptera*. The *genital papillae* are a pair of small, membranous lobes situated immediately ventral to the opening of the oviduct between the ventral edges of the ovipositor lobes; they are usually not developed, or at least not readily visible in mounted preparations, but are prominent in a few groups (e.g. *Lymantriidae*). Kusnezov has shown that they are homologous with the valvae in the male and are therefore the gonopods of the ninth segment, the lateral ovipositor lobes of other groups of insects; the anterior and the posterior ovipositor lobes of other groups of insects are absent in adult *Lepidoptera*. The ninth sternum is sometimes visible as a sclerotized plate or band, usually in the form of a small inverted "U" or crescent, just anterior to the genital papillae.

THE EIGHTH SEGMENT.—This is the segment which is mainly modified in connection with copulation. The tergum and sternum are frequently fused laterally, forming a ring around the abdomen which may, however, be broken in the mid-ventral line. The *eighth tergum* is, in most cases, larger than the sternum and has its anterior corners produced as a pair of rods, the *anterior apophyses*, which are similar in form and function to the posterior apophyses; the posterior edge of the tergum is sometimes adorned with hair or specialized scales. The *eighth sternum* is usually highly modified and its shape and degree of development are of the greatest taxonomic value. The ostium bursae may open above, in the middle of, or below the sternum, which may be of almost any shape or form; frequently it is in the form of a heavily sclerotized plate immediately above or around the ostium and not attached to the tergum; in such cases it is often referred to as the *genital plate*. It is often divided down the mid-line, or on either side of the ostium. The *vaginal lobes* are lobes developed from the eighth sternum in certain *Pieridae* (e.g. *Pieris*) and *Papilionidae*. The *sphragis* is a pouch situated on the ventral surface of the eighth segment, in certain *Rhopalocera*.

The *ostium bursae*, or external opening of the ductus bursae, is usually situated on the ventral side of the eighth segment and frequently has its edges, particularly its lower edge, sclerotized to a greater or lesser degree; in some species (e.g. *Polyommatus*) the ductus projects from the abdomen as a long tube with the ostium at its apex. The *ductus bursae* is the tube connecting the ostium with the bursa copulatrix and is of varying lengths and widths. It may be very long (as in *Pseudoips bicolorana*), in which case it is twisted in a spiral within the abdomen, or very short (as in *Papilio machaon*), so that the ostium opens almost directly into the bursa. Frequently it is sclerotized, spined or otherwise ornamented; this ornamentation may take many forms, the most usual being for it to be sclerotized just below the ostium. In some forms (e.g. *Zygaena*) the ductus is twisted to one side, allowing copulation from one side only. The *ductus seminalis*, which is usually not preserved in preparations made from dried specimens, joins the ductus bursae at some point along its length. The ductus opens into a

large, blind sac, the *bursa copulatrix*, in which the spermatozoa are stored. This is usually rounded or ovoid and is often lobed or pouched and its shape is of considerable taxonomic value. It may be variously thickened and sclerotized but normally there are only one or two strongly sclerotized thickenings in its walls, the *signa*. The signum is most usually in the form of a spine, bunch of spines, or a dentate patch, but may be of almost any shape or form and its shape is of considerable taxonomic value. The *cervix bursae* is the part of the bursa nearest the ductus, the *fundus bursae* the part of the bursa furthest away from the ductus, and the *appendix bursae* is any lobed part of the bursa, or, when the bursa is constricted in the middle, the apical portion. The *colliculum* is a name applied to any sclerotization of the ductus bursae, and the *lamina dentata* is a name applied to the signum when it is in the form of a spined plate.

THE SEVENTH SEGMENT is normally not modified in connection with the genitalia except that the sternum is frequently more or less emarginate in the middle of its caudal edge below the ostium and may be more strongly sclerotized.

SPERMATOPHORES.—Flask- or bottle-shaped capsules are often visible in the bursa copulatrix and these are known as the spermatophores. According to Petersen (*Zts. Wiss. Zool.*, 1907: 177) these are formed in their final shape in the male and remain intact in the female bursa. They are usually flask- or bottle-shaped and the open neck is apparently exactly the length from the bursa to the opening of the ductus seminalis, into which their contents are squeezed by muscle pressure (Busck, *Bull. Brooklyn Ent. Soc.*, 1931: 119). The shape of the spermatophore is of some specific value and is often similar to that of the bursa in the same species; the presence of a spermatophore in the bursa indicates that the female has mated once and when more than one is present each indicates a separate mating (Williams, *Trans. Soc. Brit. Entom.*, 1939: 137). Busck regards the spermatophores as being really the coagulated surface of the mucous or gelatinous material surrounding the spermatozoa, and this seems a very likely explanation.

TABLE SHOWING THE MORPHOLOGY OF THE FEMALE GENITALIA IN LEPIDOPTERA.

Structure.	Name in Lepidoptera.	Additional Structures in Lepidoptera.
11th Segment.	(Not developed.)	—
10th Segment.	10th Segment.	—
Tergum.	Ovipositor lobes.	—
Sternum.	(Not developed.)	—
9th Segment.	9th Segment.	—
Tergum.	Tergum.	Posterior apophyses.
Sternum.	Sternum.	—
Posterior ovipositor lobes.	(Not developed.)	—
Lateral ovipositor lobes.	Genital papillae.	—
8th Segment.	8th Segment.	—
Tergum.	Tergum.	Anterior apophyses.
Sternum.	Sternum.	Ostium bursae, etc.
Anterior ovipositor lobes.	(Not developed.)	—

EXPLANATION OF PLATE.

Typical female genitalia of Lepidoptera: 1, Side view; 2, Ventral view; 3, Longitudinal section. All figures diagrammatic.

**THE POSSIBILITY OF THE MALE UPPERSIDE AB. METALLICA
OF LYSANDRA CORIDON BEING INDICATIVE OF A VERY FATAL
DISEASE IN THAT SPECIES.**

By H. A. LEEDS.

Herein I am recording some extraordinary observations made by myself in connection with the appearance of ab. *metallica* in some areas and the consequent almost or total extinction of *L. coridon* in the next one or two years.

Some years before the 1914 war, at Halling, Kent, two collectors each caught, and let me examine, a rough textured and finely darker peppered male *coridon*. I had not seen any like them before, but was told "it was known as *metallica*," and subsequently that term has been handed from mouth to mouth and expresses its best metallic appearance, as in the two then under notice; *coridon* were plentiful there at the time but the next year were entirely absent.

In 1918 I was at Pulpit Hill, Bucks, and several of the best hairless and varied coloured *metallica* were taken and shown to me. (Several of them are now in the "Bright collection," bequeathed to the South London Society.) In between times I was in Oxfordshire, and when calling at a collector's house found he was just setting a good *metallica*. The next day he took me to the place where captured and I caught one inferior greenish *metallica*. The next year, 1919, *coridon* was extinct at both places. It was several years before *coridon* appeared at either of these somewhat limited areas again, but they continued in small numbers.

Since 1919 *metallica* turned up in six places where I was able to make more full observation until 1939, and saw that aberration occurring in each case for two years in succession before the climax of fatality in the third year. In no case did any of the best metallic polished forms occur until the second year, so apparently they indicate that almost or total extinction will follow in the next season.

Sometimes these best metallic forms were not seen in an area in either of the two years, but they may have been sparsely present in the multitudinous number of *coridon* flying. All examined in those cases were of the dark peppered on a greyish ground kind; only such were seen in one locality in Oxfordshire and after the second year total extinction followed. After a few years *coridon* began to again appear there and built up well until a repetition of *metallica*'s two years' presence again was followed by total extinction. These fatalities happened 13 years apart, and the last time a few *coridon* appeared after two years and were getting more numerous when the present war stopped my visits.

Royston, Herts, with its large area went down to almost extinction following two years' appearance in limited numbers of the pale-greyish and other inferior kinds. It seems incredible that, with such a small number of *metallica* appearing amongst such large quantities of *coridon*, they can be the pointer for forewarning of the calamity, and although for the two years of plenty I told many collectors that I expected much depletion, it was even greater than seemed possible, as it was so general that another collector and myself spent fifteen days searching all parts

of the Heath during August, and the most *coridon* we saw collectively in one day was seven—this was, I believe, in 1926. In the other nine cases total extinction occurred in Berks., Bucks., Kent and Oxfordshire. Other hillsides not far distant were unaffected.

If *metallica* is not indicative of extinction the coincidences are remarkable. It is necessary to add that ichneumonids were not totally responsible for the extinctions; nor was wet, or climatic conditions, such as would lead to a supposition of ill influence. Wet, in many species, if prolonged keeps food-plants continuously too moist and causes an epidemic of diarrhoea fatal to many of the larvae. In Nature *coridon* larvae are not seriously, if at all, affected by sharp frosts. In most of the cases prior to extinction the females were seen to be laying freely, and in some cases limited observation showed larvae had resulted; in the 1919 (Pulpit Hill) case some were ichneumonised, but not a big percentage; none, however, emerged. In 1920, about 150, mostly female *coridon*, were sent me in two lots from Royston and I was asked to release them on Pulpit Hill; this was done as no *coridon* had appeared. Some of them lived for several days and oviposited, but again there was no emergence in 1921.

Perhaps in more peaceful times further investigation may throw more light on what is apparently a disease. Try rearing and watch larvae obtained from an area where *metallica* males have appeared; if possible, feed some on the local food-plant, Horse-shoe Vetch (*Hippocrepis comosa*), and others on plants from another place, to see whether the plant, or earth, may be carrying infection. Keep them well apart throughout. The larvae can be reared without ants being present, but there is a possibility of ants carrying an infection, as in nature *Formica rufa* is an attendant and takes the secretion from the honey-gland situated on the tenth segment of a *coridon* larva; so far as is known, the ants have no natural murderous inclinations against the *coridon* larvae or pupae, and it is now well known that ants preserve those stages in *Maculinea arion*.

All of these male upperside specimens of *metallica* are of a rough textured appearance and the wings are extensively finely peppered with dark or blackish; the ground colour varies considerably, palish-grey, grey, greenish, bluish, or lavender; some of these are much darker in ground colour than others, either dull or metallic.

It has been elicited from enquiries made that *syngrapha* excessively appearing indicates extinction, but I have been unable to find, except in the case of Pulpit Hill, that *metallica* was present at the same time. In all of my other places *syngrapha* was very scarce or in the majority entirely absent.

When *metallica* occurs there is usually considerable variation amongst the other *coridon* and this might encourage breeding research.

During the many years of observation I have never known *coridon* to be totally exterminated in an area (apart from cultivation) unless *metallica* occurred. Some places I visited, or had reported to me yearly until 1939, have been going fairly plentifully and continuously for nearly 40 years, but good aberrations are seldom met with thereon.

All collectors have been most willing to let me see their captures, and amongst them most of the *metallica* were noticed, as comparatively few were taken by myself. In the *Monograph of the British Aberra-*

tions of the Chalk-hill Blue Butterfly, by Bright and Leeds, *metallica* is included as a term for general use when a rough textured and finely dark-peppered appearance occurs, irrespective of whether dull or metallic; it occasionally occurs as *syngrapha-metallica*, on the female upperside of *L. coridon*, and oddly they were taken in 1918 at Pulpit Hill. Their appearance is less in effect than in the males, and neither in those females nor in any other species do I consider their presence as indicative of extinction. Some of the *coridon* males have a peculiar unhealthy appearance in ab. *metallica*; time may prove whether their looks belie them. It would be interesting to know what result could be obtained if a *metallica* male could be induced to pair with an ordinary female *coridon*; the latter should be obtained on emergence before any other pairing had been effected. The larval food-plant should be obtained, and also the female, if possible, from a different place to where the *metallica* occurred. More than one virgin female might be introduced into a large breeding cage set out in the sun and with the food-plant and other herbage included as dug up with the earth and packed in a box for continuing growth; some young plants of a Horse-shoe Vetch should be added in the box in early April and none of the previous herbage, on which eggs may have been laid, should be removed. The contents of the box should be sprayed with a little water occasionally throughout; a nail-brush can be used if the bulk of the water is first shaken off.

COLLECTING NOTES.

THE BRIGHT COLLECTION.—A further portion of (the late) Percy Bright's collection of British Butterflies was sold at Messrs Debenham, Storr & Sons, Ltd., on 7th May 1942. The total sum realized was £372 18s for 324 lots.

Among them the following were the most interesting:—A suffused *machaon* ♀, £2; one melanic ♀ ditto, £7; a specimen ditto with black forewings, £3; ten *fasciata* forms of *P. brassicae*, £2 4s; seven yellow-tipped forms of *cardamines*, £1 18s; a melanic ♀ *paphia*, £11; another ditto, ten guineas; a ♀ *paphia*, var. *confluens*, £2 10s; another ditto, £2 16s; yet another ditto, £3; two almost entirely black forms of *aglaia*, £2 15s; a light and a dark form ditto, £2 10s; two yellow forms of *euphrosyne*, £3 10s; four selected forms of *selene* and a white ♂, £4 5s; *A. urticae*, a fine form of *nigrocaria*, £4; another ditto, £4 15s; a melanic form of *c-album*, £4 15s; a light form ditto, £2 15s; nine ♂ *iris*, £2 4s; a ♂ *iole*, £2 6s; a fine ♂ ditto, spots on hindwing absent, £2 10s; a ♀ *dispar*, £2 15s; a ♀ ditto, imperfect, £2 5s; a pupa case of *dispar*, 10s; two golden *jurtina* ♂s, £1; one specimen of *antiopa*, 18s; another ditto, £1 4s; a dark ♀ *polychloros*, two guineas; *coridon*, a *cinnameus* ♂ and a partim-transformis specimen, £1 6s; a fine *radiata* underside of *astrarche*, £4 10s; a pair ditto, £2 2s; a perfect gynandromorph of *argiolus*, £7; a fine *caeca* form of ditto, spotless, £1 12s; another ditto, £3 5s; *aegon*, two of form *caeca*, one white, one brown, £5 5s; an entirely blue ♀ ditto, £2 5s; three *striata* forms of *aegon*, nine underside forms, and a fine *radiata*, £4; five undersides of *arion*, including a good *obsoleta*, five guineas; eighteen ♂ and ♀ *arion*, £1 10s; two fine *caeca* undersides

of *minimus*, £1 2s; an albinistic ♀ of *lucina*, £1 6s; a pretty ♀ form of ditto, £1 14s; a light brown and a pale form of *A. sylvanus*, two guineas; an albino *comma*, £9 10s; a ♀ *palaemon* with black forewings and rayed hindwings, £8. A mahogany cabinet with 51 drawers sold for £21, and 41 volumes of Sowerby's Botany for £13.—H. E. P. [Sowerby was really cheap.—HY. J. T.]

BLEACHED MANIOLA JURTINA, L.—My experience in regard to the sex of this ab. is the same as Mr Siviter Smith's as reported in the June number of this journal. Towards the end of August and all September the fulvous patch on the front wings of the ♀s is frequently found bleached in specimens caught on the Winchester and Farley Downs.—H. G. HARRIS, Southampton.

"SUBSTITUTE FOODPLANTS."—Mr P. B. M. Allan in his interesting notes on substitute foodplants (ante, p. 63) records that larvae of *Cucullia verbasci*, L., when taken from plants of *Verbascum thapsus*, L., and transferred to *Scrophularia aquatica*, L., devour the latter plant equally readily. It is a fact, however, that in the Coleoptera, beetles of the genus *Cionus* all feed on species of either, or both, mulleins and fig-worts; though possibly in this case the plants can hardly be called substitute.—HORACE DONISTHORPE.

SOME OBSERVATIONS ON SATURNIA PAVONIA, LINN.—Tutt, *Brit. Lep.*, Vol. iii, 307, gives as the "original description" of this beautiful moth, "*Phalaena Bombyx pavonia*." Newman also includes it among Bombycees. Although it has, I fancy, always been in this neighbourhood, in greater or less numbers, I never happen to have seen it here personally, for one reason or another. This year it has been plentiful on all our heaths. On 20th April I first saw a good number—two dozen or so—flying between 3.45 and 4.30 p.m. (D.S.T.) and managed to capture one. This was in a corner of a large Common with which I am very familiar. Thinking it would batter itself to pieces, it was surprising to find it quite quiet when boxed. I was wrongly frightened by the old Bombyx attribution. The same thing occurred between 5 and 6 p.m. (D.S.T.) on 24th April. Wind strong N.E., bright sun, not quite so numerous, flight stopping at 6 p.m. (D.S.T.). On 26th April I found one flying in my own wood, and a few on adjoining small Common, between 4 and 5 p.m. (D.S.T.). 27th April—Again a few, same place and time. 28th April—One, seen same place and time. 29th April—One, seen on a third nearby Common, 4 p.m. (D.S.T.). 30th April—Saw a great number on the big Common first mentioned, 4-5 p.m.; caught one, but their pace was terrific, and I am confident they can see you and fly just out of reach, varying their line slightly so as to pass you safely. 3rd May—Found them in great numbers, in a fresh locality, flying too high and fast, but caught one as they flew lower at 4 p.m. (D.S.T.). May 8th—Saw only one flying, same place, at 4 p.m. One similarity on all the above occasions was the ability to fly with, against, or across wind, or in circles. Edward Newman's "*Insect Hunter*" (*Entom. Mag.*; Vol. iii, p. 309) says they always fly against wind. Barrett, Vol. iii, p. 61, says:—"The male is seldom seen unless a freshly emerged female is at hand," and Tutt, *Brit. Lep.*, Vol. iii, p. 333, says: "It's erratic flight (is) very intimately connected with the discovery of

the female." As to this my recent observations did not produce any supporting evidence. The flight was usually to and fro, on the same line of about 100 yards, two males often passing me at the same time in different directions. It would seem that so large a number of males flying simultaneously in all directions and not finding the female is somewhat inexplicable. Perhaps it is merely a flight of courtship. Again, as sexes tend to be numerically equal, where are all the females when the afternoon flight takes place? They may be in the heather, but then one would expect to see one occasionally. When "sembling" is practised, the males apparently throng to the females in an obvious way; why, therefore, this flight of males merely to discover the female? I once, at Sandhurst, saw a male and female (in cop) on a Common, about noon, but that is the only occasion on which I have seen the female. It is possible that the sudden re-appearance here of this species, in such abundance, is due to military reasons, their usual habitat being too much disturbed, or the conditions may have just suited it this year.—(Capt.) ALBAN. F. L. BACON, M.A., Burghclere, Hants., 10th May 1942. [It would be much more useful to record by sun time instead of using the self-deceptive method now in the very local use in these islands.—H. J. T.]

EUPHYDRYAS AURINIA IN SNOWDONIA, N. WALES.—Further to my note [*Ent. Rec.*, liv, April 1942, p. 44] pointing out the colony of this species at Dolgelly, I find that Mr Thompson referred to it himself in another note on the same subject [*Entomologist*, lxxiii, November 1940, p. 253]. I do not, however, remember it as being on low-lying ground although he states this in reference to the Dolgelly colony.—P. SIVITER SMITH, Little Aston Park, Streetly, Staffs.

CURIOUS ENTOMOLOGICAL DRAWINGS.—Mr Francis J. Griffin (ante, p. 51) when mentioning some curious entomological drawings belonging to the Royal Entomological Society of London refers to a painting called "The Entomologist," which may possibly be the origin of a cartoon also called "The Entomologist" described by Mr G. S. Castle Russell in the February number of the *Record* (ante, p. 9). This reminds me of a menu of one of the dinners given by the Entomological Society of Leicester. On hunting through my various entomological albums (one day to be the property of the Royal Entomological Society of London) I came across the same. It is a menu of the annual dinner of the Leicestershire Entomological Society (Section F. of the Leicester Literary and Philosophical Society) given at the Royal Hotel, Leicester, on 23rd February 1906. A photograph, which is evidently that of "The Entomologist" in question, is pasted on the menu; though how and whence it was obtained I know not. The parts of the figure mentioned by Mr Griffin are the same, but I should say the "nondescript fly" of the left thigh and knee is a termite, not a winged ant. Another interesting picture in the possession of the Society may be conveniently mentioned here. It is the reproduction of a drawing made by Joshua Taylor Wordsworth and painted by Rosamond Flower Donisthorpe. The picture is made from a photograph of Henry Walter Bates, who is seated in a canoe on the river, presumably the Amazon, in company with a South American Indian. They are surrounded by tropical foliage, amongst which a monkey and a snake fascinating a small bird are depicted. The head of

a crocodile is poking out of the river in the foreground and a parrot is seated on Bates's shoulder. This picture was presented to the Society by myself a good many years ago now, and I obtained it from an old family album.—H. DONISTHORPE.

CURRENT NOTES.

HONOUR to whom honour is due! All of those who know Mr A. H. Hamm, of Oxford, so long an assistant in the Hope Museum and a fine observer of the habits and life histories of many hitherto obscure insects, has been awarded the degree of Honorary M.A. Entomologists will be gratified for this mark of recognition of valuable scientific work.

SEVERAL separates have reached us from the *Ind. Journ. of Agric. Science*. Two of them deal with the identification of the larvae and pupae of the lepidopterous pests of the sugar-cane, some twelve in number. The first describes the larvae of 12 species, of which 9 are Pyralidae and 2 Noctuidae. After the descriptions figures are given of the setal arrangement on the segments, and of the crochets on the abdominal prolegs. A Key is added, using all the larval characters illustrated in the paper. The authors are Messrs P. V. Isaac and K. V. Rao. The second is a paper describing and illustrating the pupae of the same 12 species and giving a Key also based on the characters used in the descriptions and figures. The 5 plates in this paper show the details of the ventral segment, cremaster, etc., in particular detail. Messrs P. V. Isaac and T. V. Venkatraman are the authors. A further separate deals with a small group of Scale Insects which attack fruit trees in India and which much resemble the well-known San José Scale, for which they have hitherto been mistaken. Messrs K. A. Raman and A. Raman are the joint authors. There are 3 plates.

THE *Canadian Entomologist*, Nos. 1-3, 1942, lie in front of us. Nearly the whole contents are contributed by professional entomologists. Are there no amateurs in the Dominion now? Have they all disappeared and no one to take their place? Twenty, thirty, forty years ago this magazine was run by amateurs actuated by the love of nature study; now apparently it has been captured by a corporation, who study entomology from a mercantile point of view in which the true scientific aspect is entirely absent. What a pity!

THE *Ent. News* (Philadelphia), March, has a discussion on the Use of the terms "instinct" and "intelligence," etc., used in Discussions of Animal Behaviour, which is well worth reading. There seems to be a great misuse of words which have been used for ages in reference to human behaviour and carry with their import the association of their life-long existence. If such terms be used in relation to animals in no way comparable with humans in their actual constitution and environment, they must carry with them suggestions of behaviour which can only hinder the real investigation of insect behaviour. The writer of the article has only touched the fringe of this misuse. The most glaring instance of such misuse is that of the term "Mimicry" for a special phase of Insect Behaviour, well expressed under the unequivocal phrase "Protective Resemblance."

THE Spanish Magazine *Eos* has now been brought up to date with the part iv of volume xvii (1941). The two chief articles are on Orthoptera (Locustidae) and Coleoptera (Hylophilidae). Illustrations of the perfect insect in each species dealt with are given. The first three sheets of a Supplement, an Introductory Treatise on the Tribes of Spanish Hymenoptera, with detailed figures of the typical form of species in each, are given. This will doubtless be a good incentive to students to take up intensive work on the Order.

REVIEWS.

FOSSIL ORTHOPTERA ENSIFERA. By F. E. Zeuner. 2 vols. (British Museum, 1939. Vol. 1, 321, 15/-; Vol. 2, 80 plts., 20/-.)

This extremely important work had the misfortune to appear shortly before the outbreak of war, which has deprived it of much of the attention it deserves. It is really epoch-making, for it places our knowledge of the *Ensifera* upon a sound logical basis.

The fossil Orthoptera are much better known and more deeply studied than is generally realized. Of the *Ensifera* alone there are 157 species clearly recognized. Unlike modern forms, in which the genitalia offer such valuable characters, with the fossil forms it is the shape of the body and in particular the venation upon which the classification is based.

The author has defined in word and photograph the half-formed ideas that were shaping themselves in my mind very many years ago, on instinctive feeling, without the basis of any knowledge of the fossil forms. It always seemed to me that there was some fundamental difference between the round-headed, obese type of Tettigoniid, usually vegetarian, and the sharp-headed, more slender forms, mainly carnivorous, just as the flat-sided, carinate form of pronotum seemed to me to be modern, and the saddle-type, without distinctive demarcation of the dorsal from the lateral surfaces, seemed primitive. In the same way, I felt that the Gryllacrids, with their antediluvian appearance, their absence of stridulating organ, and the organs of flight wrapped around the body, with no differentiation of dorsal or lateral fields, must have something primitive and ancestral about them.

The *Ensifera* are those Orthoptera in which the female is armed with an exerted ovipositor, but the author does not divide them simply into the familiar groups of Crickets and Tettigoniids. He classifies them into five families, the *Gryllacrididae*, *Prophalangopsidae*, *Gryllidae*, *Gryllotalpidae* and *Tettigoniidae*. Of these the only one that is likely to be unfamiliar to the average orthopterist is the second, rejoicing unfortunately in an enormous name. This is a pity, because it is a very important group.

The *Ensifera* as a group can be traced back to the Carboniferous. Their ancestors belong to the *Protorthoptera* and are closely related to those of the *Acridiodea*. It seems that the two groups branched off about the Middle Carboniferous. It is surprising to note that the short antennae, 3-segmented tarsi and reduced ovipositor so characteristic

of the *Acridiidea* do not appear before the Upper Jura, but their method of stridulation is very ancient.

The *Gryllacrididae* have retained more ancestral characters, he tells us, than any other modern group of Saltatoria: for instance, the rounded head, with low basis of the antennae, the keelless pronotum, without lateral lobes, the primitive type of the tracheal apparatus of the forelegs, and the undifferentiated cerci. Rather surprisingly, the folding and wrapping of the elytra and wings he regards as a later acquisition, while the absence of stridulating organs is primitive. The *Gryllacrididae* are in fact a side-branch of the main stock of the long-horned grasshoppers.

To the ordinary person the *Prophalangopsidae* look like some exotic Tettigoniids, but the difference is profound. The group is intermediate between the more primitive *Gryllacrididae* on the one hand and the Crickets and *Tettigoniidae* on the other. They first appear during the Trias, and were dominant in the Jurassic. There exists in the British Museum the unique type of *P. obscura*, described by Walker many years ago. It is the only known specimen of a still existing species. It was found among some miscellaneous insects from India presented to the Museum in 1861, but its locality is unknown. It is now recognized that the North American genus *Cyphoderris*, with two species, is referable to this family. Neither of these genera is ancestral to our Tettigoniids, or Crickets, but they are specialized offshoots of the true ancestral group that flourished in the Trias and Jurassic. It is hardly surprising that Walker's species puzzled de Saussure. Handlirsch came nearer to the truth.

The *Gryllidae* first appear in the highest Trias in South Africa and the Lower Lias of Europe. The *Gryllotalpidae* and the *Gryllidae* both derive from the *Protogryllidae*, but it is not until late Miocene that we find the first true mole-cricket.

The *Tettigoniidae* seem to have evolved during the Cretaceous and Upper Jurassic, though only one form, *Termitidum*, from the Upper Jurassic, has been found earlier than the Eocene. True *Decticinae* appear in the Lower Miocene, with the *Conocephalinae*. The Phaneropteroids were an early offshoot.

The introductory portion of the book is full of interest and very suggestive. Zeuner rejects Handlirsch's view of the origin of the *Dermaptera*, who drew them from the Saltatoria, and Tillyard's, who drew them from the *Protoelytroptera*. Zeuner considers them a separate stock of orthopteroid insects that might have arisen from the *Protoblattoidea* or *Protorthoptera*, or possibly from some still unknown group related to the *Protoperlaria*. The Blattids and Mantids with the *Isoptera* he draws from the *Protoblattoidea*, while the Phasmids he derived from the *Protorthoptera* independently of the Saltatoria. The five-segmented tarsi are a primitive character.

It is to be noticed that among these primitive groups the colour is generally brown. That is no doubt correlated with their life in dark holes and nocturnal habits. I have noticed, though, in Africa that the immature Gryllacrids are green, which leads me to think that the brown colour is a later acquisition, and that the primitive coloration was green, as would be natural in forest-haunting creatures.

All orthopterists should be grateful to Zeuner for his splendid work, which places the groups of the Order in reasonable perspective.
—M. BURR.

COLLEGE ENTOMOLOGY. By E. B. Essig (Professor of Entomology in the University of California). 900 pp. small quarto. The Macmillan Co., New York, 1942.

This is essentially a consultative book of facts; it is admirably arranged and extremely well illustrated, with an unusually complete Index of 63 pp. in 3 columns. There are 308 so-called figures, but most of these are compound, occupying a page with names attached to each feature in each component. For instance, a plate (fig.) illustrating the "dog flea" (Siphonaptera) has 16 sub-figures, one of which, that of the imago, has 38 details named around it, a method saving time and chance of error. The main insects cited are of course American, although those of other areas are used freely. There are 3 Introductory Chapters: Metamorphosis, Anatomy, and Classification of Insects, occupying 60 pp. The remaining 33 Chapters are devoted to admirably chosen and adequately full accounts of the 33 Orders into which modern scientists have placed the whole "World of Insects." Each chapter is complete in itself. These Chapters take up nearly 760 pp. of matter; most of the chapters were submitted to a specialist in the Order dealt with, whose name is given in a footnote in each case. As an example: the Order HEMIPTERA, Chap. xxv, takes about 100 pp. Common names: general description in its major divisions: notice of its history from 1735 onward: distribution, biology, economics, fossil ancestors, development and abundance. Then comes a close detailed Key to the three Sub-Orders, Heteroptera, Homoptera, and Coccoidea; their external and internal characters; the classification (by a specialist) dealt with by Families (each illustrated by important typical well-known species): relation to man, to other beings, to vegetation, to disease, etc., and life-histories of note. Each Sub-Order ends with a short Bibliography. In each Order the Chapter is completed by a further Bibliography of additional works. For illustration of the characteristic Life-history in an Order (or even of a Group), that of an outstanding pest, etc., has been selected, e.g., an Aleyrodid, Coccid, Phylloxera, Apple-aphis, Oystershell Scale, Tomato Psyllid, Pine Spittle-bug, Colorado beetle, etc.

Even an interest in the past history of the observations on Insects has been incited by a few plates:—Portrait of Linnaeus; the title-page of Moufet's work, 1634; Swammerdam's Internal Anatomy of the May-fly, 1738; the first drawing made with a lens, the honey-bee, 1630; and figures of various forms of Termitaria are included.

This appears to be one of the most useful and comprehensive books of modern times and quite up to date in the facts it records. The amount of material enclosed in these pages is phenomenal, and without once entering into controversial matters. Not only has the author put his own skill as an assembler of matter for entomological workers, but he has marshalled specialists, who know their groups and has got their best. The publishers, too, have done their part and the volume is presentable in every way. The price, too, is not too heavy in these times. Five American dollars is reasonable for this valuable, encyclopaedic work.—
HY. J. T.

Splr., *Schm. Eur.*, I, 246, plt. 45, 33 (1906): South, *M. Br. Is.*, II, 9, plt. 4, 7 (1908): Hamp., *Lep. Phal.*, V, 9, 148 (1910): Warr.-Stz., *Pal. Noct.*, III, 228, plt. 46 h (1911): Culot, *N. et G.*, 1 (2), 75, plt. 52, 16 (1914): Meyr., *Rev. Hand.*, 72 (1928).

Ernst & Engram., *Pap. d'Eur.*, VII, 402 d (1790), figure it as a remarkable variety of 402 a, b, c, which represent *subtusa*. The figure is rather small.

Schiff., *Verz. Noct.*, T. 88, 18 (1775), calls it "Bandweiden Eule" feeding on *Salix viminalis*. Illiger, *Verz.* (1801), I, 319, adds "Many other willows and poplar."

Esp., *Abbild.*, IV, *Noct.*, II (2), p. 689, plt. 178, 1 (1792-?), gave a very fair figure.

Donovan, *N.H. Brit. Ins.*, X, 67, plt. 350, 2 (1801), gave an excellent figure.

Hb., *Samml. Noct.*, 214 (1800-3), gave a good figure. His figure in the *Beitr. (vetula)* was poorly executed.

Haw., *Lep. Brit.*, 251 (1809), dealt with the *retusa* of L. & Fb., and included *vetula*, Hb. Of the form *gracilis*, he suggested a sexual variety.

Steph., *Ill.*, III, 56-7 (1829), reports it as having been called *chrysoglossa*, Beckwith (*Linn. Trans.*, II). He treated *gracilis*, Haw., as a good species "from which it is scarcely specifically distinct."

Dup., *Hist. Nat.*, VI, 145, plt. 82, 3 (1826), gave a good figure.

Frr., *Beitr.*, III, 157, plt. 143 (1830), gave a good figure, rather dark grey.

Wood, *Index Ent.*, 63, plt. 14, f. 336 (1834), gave a good but very dark figure.

Guen., *Hist. Nat.*, VI, 3 (1852), gave three synonyms, *chrysoglossa*, Tr.; *vetula*, Hb., *Beitr.*, plt. 2, H, and *gracilis*, Haw., 208, and gave Ernst & Engr., 402 d (non a-c) as a reference.

Meyr., *Hand.*, 118, genus *Caradrina* (1895), *Rev. Hand.*, 72, genus *Caradrina*.

Splr., *Schm. Eur.*, I, 246, plt. 45, f. 31 (1906), gave a very fair figure but much too dark and the lines not sharp enough.

South, *M.B.I.*, II, 9, plt. 4, 7 (1908), gave a good figure of the olive-brown reddish-tinged form ab. *gracilis*, Haw.

Hampson, *Lep. Phal.*, IX, 148, fig. 43 (1910), treated the *curvata*, Butlr., of Japan, as an aberration, and the *vetula*, Hb., *Beitr.*, as a synonym:

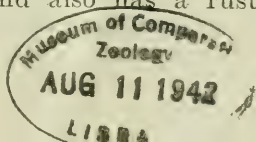
Warr.-Stz., *Pal. Noct.*, III, 228, plt. 46 h (1911), gave a good figure. They considered *vetula*, Hb., as a synonym, and recognized ab. *gracilis*, Haw., of which they considered *curvata*, Butlr., a synonym.

Culot, *N. et G.*, I (2), 75, plt. 52, f. 16 (1914), gave a correct figure but too dark.

Tutt in his Appendix to *Brit. Noct.*, Vol. IV, 122, dealt with the Japanese form *curvata*, Butlr., a slightly larger and darker form (or species). Warr.-Stz. stated that *curvata* was the *gracilis*, Haw., and *vetula*, Hb., was the typical *retusa*, L.

The *vetula*, Bdv. (Hb. ?), was dealt with and figured by H.-S., *Bearb.*, II, 200, fig. 108. The figure is unusually large. H.-S. himself said it is usually not so bright blue-grey and also has a rust-yellow streak in place of the claviform.

13, 820



Barrett described the Variation as follows:—

Only a little variable in size, and in the depth of ground colour and clouding of the forewings.

The Names and Forms to be considered are:—

retusa, L. (1761), *Fn. S.*, 321.

vetula, Hb. (1788), *Beitr.*, I (3), 13, plt. 2, H.

f. *gracilis*, Haw. (1809), *Lep. Br.*, 251.

ssp. *curvata*, Btlr. (1886), *Tr. Ent. S. Lond.*, 131.

Tutt dealt with: (1) the olive-grey typical *retusa*; (2) the brown-reddish tinted *gracilis*, Haw.; (3) the larger Japanese *curvata* (in his Appendix to Vol. IV, p. 122):

vetula, Hb., *Beitr.*, I (3), 13, plt. 2, H (1788), described and figured *retusa* under this name, which he found later had already been described. Subsequently he omitted all mention of the name *vetula*.

ssp. *curvata*, Btlr., *Trans. Ent. Soc.*, 131 (1886).

ORIG. DESCRIP.—“ Primaries sericeous, purplish-slate coloured with the exception of a submarginal band and the fringe, which are bronze-brown; ordinary lines, black, slender with whitish inner edges; the first subbasal, angular, the second at basal third oblique and slightly curved, the third just beyond the external third; nearly straight, but with a slight sinus at the point where it is crossed by the first median branch; a fourth indistinct line, limiting the external border, nearly straight from costal margin to third median branch, and thence undulated to inner margin; discoidal spots outlined in white; secondaries sericeous bronze-brown, darker towards the outer margin; fringe whitey-brown traversed by a dark brown line; body brown, the abdomen greyer than the thorax; under surface whitey-brown, sericeous, with golden-bronze reflections; primaries with the exception of the borders, suffused with blackish, and showing darker indications of the third and fourth lines of the upper surface; secondaries crossed by two irregular, ill-defined dusky stripes. Expanse 29 mm.” Fukushima, Yokohama.

Hamp., *Cat. Lep. Ph.*, IX, 148 (1910), forewing somewhat redder. Japan.

Plastenis, Bdv. (1840), Dup., H.-S., Splr., Sth., Culot [*Ipomorpha*, Hb.] (1821), Hamp., Warr.-Stz. *Caradrina*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Tethea*, Ochs. & Treit. (1816-25), Wood, Gn., Barr.] *subtusa*, Fb. (1787).

Tutt, *Brit. Noct.*, III, 20 (1892): Meyr., *Handb.*, 118 (1895): Barr., *Lep. Brit. Is.*, V, 128, plt. 225, 3 (1899): Stålgr., *Cat. III* ed., 203 (1901): Splr., *Schm. Eur.*, I, 246, plt. 246, 1 (1906): South, *M.B.I.*, II, 9, plt. 4, 6 (1908): Warr.-Stz., *Pal. Noct.*, III, 228, plt. 46 h (1911): Culot, *N. et G.*, I (2), 75, plt. 52, 17 (1914): Meyr., *Rev. Hand.*, 118 (1928): Draudt-Stz., *Pal. Noct. Supp.*, III, 148 (1934).

Schiff., *Verz. Noct.*, T. 17, p. 88 (1775), first used the name but with no adequate descriptions.

Ernst & Ingram, *Pap. d'Eur.*, VII, 9, fig. 402 a, b, c (1790), gave fair figures of this species.

- Hb., *Samml. Noct.*, 215 (1800-3), gave a good figure.
 Ochs. & Treit., *Schmett. d'Eur.*, V (1), 82 (1825), placed *subtua* in the genus *Cymatophora*.
 Dup., *Hist. Nat.*, VI, 148, plt. 82, 4 (1826), gave a weak figure.
 Fryer, *Neu. Beitr.*, I, 20, plt. 10 (1833), gave a good figure.
 H.-S., *Sys. Bearb. Noct.*, II, 222 (1849), said that Hb. 213 was much too variegated.
 Guen., *Hist. Nat.*, VI, 3 (1852), referred to Schiff., T. 17, p. 88.
 Splr., *Schm. Eur.*, I, 246, plt. 46, f. 1 (1906), gave a fair figure but incorrect in shape of forewing.
 Hamp., *Lep. Phal.*, IX, 151 (1910), gave a b. and w. figure.
 South, *M.B.I.*, II, 9, plt. 4, 6 (1908), gave a good figure.
 Warr.-Stz., *Pal. Noct.*, III, 228, plt. 46 h (1911), gave a fair figure. He gave ab. *pallida*, Tutt, as the only form.
 Culot, *N. et G.*, I (2), 75, plt. 52, 17 (1914), gave a figure in colour only slightly differing from *retusa* but contour of forewing correct.

Barrett described the Variation as follows:—

Not variable, except in a small degree, in size.

The Names and Forms to be considered:—

subtua, Fb., *Mant.*, II, 152 (1787).

ab. *pallida*, Tutt, *Brit. Noct.*, III, 20 (1892).

Tutt dealt with (1) *subtua*, Fb., and (2) from a single example described the *pallida* form. [Ernst & Engram. gave a very pale figure 402 c which one might mistake as a bad figure.]

Calymnia, Hb. (1823). Nearly all authorities and authors: [*Cosmia*, Ochs. & Treit. (1816-25), Dup., H.-S., Gn.] *diffinis*, L. (1767).

Tutt, *Brit. Noct.*, III, 20 (1892): Meyr., *Handb.*, 117 (1895): Barr., *Lep. Br. Is.*, V, 322, plt. 225, 1 (1899): Stdgr., *Cat.*, III ed., 203 (1901): Splr., *Schm. Eur.*, I, 244, plt. 45, 23 (1806): South, *M.B.I.*, II, 4, plt. 2, 6-7 (1908): Hamps., *Lep. Phal.*, IX, 189 (1909): Warr.-Stz., *Pal. Noct.*, III, 230, plt. 47 e (1911): Culot, *N. et G.*, I (2), 71, plt. 51, f. 12 (1914): Meyr., *Rev. Hand.*, 71 (1928).

Hb., *Beitr.*, I, 11, plt. 1, E. (1787), gave a good figure under the name *affinis* (which subsequently (Nach-rinnerung) he corrected to *diffinis*) of this species. (In my copy the hindwings, instead of being the grey-brown of the description, have become deep green!)

Esp., *Abbild.*, IV, *Noct.*, I (1), p. 416, plt. 134, 2 (1788-?), gave a good figure.

Ernst & Engr., *Pap. d'Eur.*, VIII, 23, fig. 543 a, b (1792), gave two very good figures somewhat too bright in colour; a dark small ♂ and a light large ♀.

Hb., *Samml. Noct.*, 202 (1800-3), gave an excellent figure.

Dup., *Hist. Nat.*, VII (1), 116, plt. 108, 4 (1827), gave a good figure.

Freyer, *Neu. Beitr.*, II, 57, plt. 130 (1836), gave a very good figure with larva and pupa.

H.-S., *Sys. Bearb. Noct.*, II, 224 (1849), notes that the white markings in Hb. 201 are too bold. He described and figured *confinis* as a species with a figure 450 which shows it to be a very dark reddish-brown *diffinis* with all its characteristic markings.

Splr., *Schm. Eur.*, I, 244, plt. 45, f. 23 (1906), gave a good figure. He recognized the ab. *confinis*, H.-S.

South, *M.B.I.*, II, 4, plt. 2, 6-7 (1908), gave two good figures: 6a, dark ♂; 7a, lighter ♀.

Warr.-Stz., *Pal. Noct.*, III, 220 (1911), gave three good figures, and treated of two forms, the *affinis*, Hb., and *confinis*, H.-S.

Culot, *N. et G.*, I (2), 71, plt. 51, f. 12 (1914), gave a very good typical figure.

Barrett described the Variation as follows:—

A little variable in size, and also in the tone of colour of the forewings, darker or paler, but in some individuals the rich chocolate clouding is absent and the general surface purple-brown.

The Names and Forms to be considered are:—

diffinis, L. (1767), *Sys. Nat.*, XIIed., 848.

ab. *confinis*, H.-S. (1849), *Sys. Bearb. Noct.*, II, 224.

f. *affinis*, Hb. (1787), *Beitr.*, I, 11, plt. 1, E.

Tutt dealt with (1) the duller typical form of Linn.; (2) the paler *confinis*, H.-S., and (3) the bright purplish form *affinis*, Hb.

As this last had been named by Hb. under the name *affinis*, and was in fact a definite form of *diffinis*, he used that name as a varietal one.

Calymnia, Hb. (1823), most authors. [*Cosmia*, Ochs. & Tr. (1816-25), Dup., H.-S., Gn.: *Caradrina*, Ochs. & Tr. (1816-25), Meyr., Meyr.] *affinis*, L. (1767).

Tutt, *Brit. Noct.*, III, 21 (1892): Meyr., *Handb.*, 117 (1895): Barr., *Lep. Br. Is.*, V, 325, plt. 225, f. 2 (1899): Stdgr., *Cat.*, IIIed., 203 (1901): Splr., *Schm. Eur.*, I, 244, plt. 45, f. 24 (1906): South, *M.B.I.*, II, 3, plt. 2, f. 4-6 (1908): Hamp., *Lep. Phal.*, IX, 190 (1910): Warr.-Stz., *Pal. Noct.*, III, 230, plt. 47de (1911): Culot, *N. et G.*, I (2), 71, plt. 51, figs. 10-11 (1914): Meyr., *Rev. H.*, 71 (1928): Dradt.-Stz., *Pal. Noct. Supp.*, III, 189, 262 (1935) (1937).

Esp., *Abbild.*, IV, *Noct.*, I (1), p. 414, plt. 134, 1 (1788-?), gave a good figure.

Ernst & Ingram., *Pap. d'Eur.*, VIII, 25, f. 544a, b, d, e, f, g (1792), gave 6 figures of forms of this species all quite good in shape, marking, and colour except perhaps fig. b.

Hb., *Samml. Noct.*, 201 (1800-3), gave a very good figure.

Dup., *Hist. Nat.*, VII (1), 119, plt. 108, 5 (1837), gave a good figure.

H.-S., *Sys. Bearb. Noct.*, II, 224 (1849), said Hb. 201 "too variegated. Waved line too white. The transverse lines should be whiter on the costa."

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PROCRUS (OLIGIA) (MIANA) LITEROSA, AB. OBSCURA, NOV. AB.

By A. J. WIGHTMAN, F.R.E.S.

In the collection of the late Frederic Pennington, recently disposed of by auction, there was an extreme ab. of *P. literosa* included among the *P. strigilis* and *P. latruncula*, which were mixed.

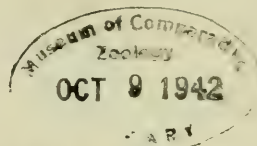
It appears almost black, but with a deep purple tinge, seen to advantage when viewed at an oblique angle.

Critical examination reveals the markings of *literosa* as dark red, and it is beyond question a very dark form of that species.

Both British and Continental authors consider *P. literosa* as the least variable species in the group, and no one has named or described such an aberration, except Barrett, who, on page 8, vol. v, records such a specimen. I call it ab. **obscura**. It was taken at Cranleigh in Surrey, and is in bred condition. It is now in my collection. Incidentally, I find the larva of this species feeding in stems of winter wheat, where the fields are bordered with wide verges of grass, at the foot of the South Downs.

Aurago," Pulborough, Sussex.

13,820



VARIATION IN EUMICHTIS LICHENEA, HBN.

By P. SIVITER SMITH.

I have already recorded a note about this species [*Ent. Rec.*, vol. xlv, pp. 12-13, January 1933], but until now I have had no opportunity of putting on record notes on the variation of the series I took and of one or two others I possess. I bred a number from larvae obtained on several occasions feeding on Thrift near Newquay, North Cornwall, and therefore almost every specimen referred to is fresh. The insects are liable to fade a little.

The species seems to have received little attention and to be regarded as a stable one, but I find it very variable and it is not always easy to match specimens. Great changes of colour and pattern are to be found.

Tutt [*Var. Brit. Noctuae*, vol. iii, p. 52, 1892] describes the type form as follows: "Hubner's type may be thus described:—♂. The ground colour dark green, suffused with red; two basal reddish-ochreous lines; the stigmata outlined in red; a dusky angulated line beyond the reniform, followed by pink lunules, and a white subterminal line; outer margin green. Hindwings white, with a dark shade and dark line parallel to hind margin, dusky lunule. ♀. Markings and colour as in ♂, but more distinct, hindwings greyer." (*Sammlung europ. Schmet.*, etc., figs. 562-563)."

Speaking generally of the typical form, variation in the amount of the pinkish or reddish suffusion runs from a distinctly noticeable colour to just a trace of pink scales. The stigmata vary in colour and distinctness and the markings in clarity. The markings of the ♀♀ are not usually so clear as those of the ♂♂ (although Tutt, *loc. cit.* above, says the markings of the ♀ are the more distinct, but I do not find it so), and I possess four ♀♀ with the hindwings whitish as in the ♂ and

not the usual brown colour. Both ♂♂ and ♀♀ are variable and in similar directions.

I find that sometimes the ground colour is more a steely blue-green than dark green, or rarely a very dark olive-green.

Tutt (*loc. cit.* above) describes the stigmata as "outlined in red." In no case do my specimens have a complete outline in red or pink; the reniform is usually partially whitish, suffused anteriorly with pinkish and posteriorly with ochreous. Only rarely are there traces of pink on the posterior edge of the reniform but it is not so unusual for ochreous to replace pink on the anterior edge, or for the reniform to be outlined wholly in whitish, or to be almost wholly ochreous. It usually has a dark or mixed centre.

The reniform may be very obscure or (rarely) hardly traceable, or it may run to a wholly whitish blotch; the posterior outline may be interrupted by a blackish, dark green, ochreous, or greyish bar, or wedge, which may sometimes extend to form a dark centre. It is very variable in shape.

The orbicular is usually less conspicuous than the reniform; there is usually an obvious dark centre and although this may be greatly reduced, a trace of it always remains. It can be wholly pinkish, ochreous, greyish or whitish, or a mixture of these colours; it usually has a dark edging. Rarely it is exceedingly obscure, almost obsolete.

The claviform may run from complete obsolescence to a blackish wedge; both these extremes are rare. It is usually a half-oval outline or part of one.

There can be up to six obscure or well-defined white or pale marks along the costa, usually associated with clearly marked specimens.

The dark markings on the forewings are extremely variable in their degree of clarity. Some ♀♀ are obscurely clouded with smoky-grey, the markings very obscure. The fringes are yellowish, sometimes darkened by green. The hindwings are variable, whitish tinged yellowish in the ♂, grey or brownish in the ♀ (although these can be coloured as in the ♂), both sexes sometimes with quite a distinct submarginal line and usually showing a dark discal spot.

The angulated band, between the posterior edge of the central fascia and the whitish or ochreous subterminal line, has pinkish lunules or shades preceding the varying blackish or rufous wedges; this band is usually of a slightly paler tonal value than the rest of the forewings, although its constituent colours may vary as the forewings.

Some examples are more or less of the typical form except that the ground colour is dark olive-green with more traces of greyish on the forewings and both the reniform and the orbicular are conspicuous whitish, the centre of the reniform also being wholly whitish with little or no trace of pink or ochreous. I would call such examples var. **albi-punctata** nov. In the typical form the stigmata are not conspicuous as a rule and they are generally well broken up by and mixed with pink and ochreous with dark or mixed centres, and therefore such examples with clear stigmata are quite distinct.

Very rarely pale bluish tinges are noticeable, particularly near the hind margin of the forewings, and one specimen I bred has this suffusion together with a small pale blue centre to the reniform stigma.

Specimens as this one, with the blue extending to the reniform, I would call var. **coerulescens** nov.

The angulated band before the subterminal band is sometimes sprinkled with whitish and pale fuscous, the pink suppressed and the dark wedges much reduced; this gives the effect of a prominent, pale, fuscous band, since the subterminal line is followed by the darker green shade. Such specimens, with a prominent paler band of this nature, I would call var. **pallido-fasciata** nov.

One ♀, of rather unicolorous dark tone, with most markings subdued, has a distinct wavy black line running between the stigmata and extending in a curve from the costa to the centre of the inner margin. This well-defined black line contrasts strongly with the indistinctness of the other markings, and I would call it var. **nigro-lineata** nov.

There is a fairly constant pale form that occurs in some localities, often replacing the typical form altogether, though none were found at Mawgan Porth in North Cornwall, where most of my specimens come from. This is var. *viridicincta*, Frr., and is a pale greenish-grey form. The central fascia is pale greenish-grey and so is the outer margin. The basal and subterminal areas are paler, greenish and whitish, so that the insect has a somewhat banded appearance, and the dark markings are more conspicuous on the lighter ground. The hindwings are also paler. No pinkish tinges are present but traces of pale ochreous are present instead.

I have two examples, a ♂ and a ♀, that form an exact intermediate between the typical form and var. *viridicincta*, Frr. There is the slightest trace of pink, mixed ochreous, the markings are distinct and the green is mixed with greyish, being lighter than typical forms but greener than var. *viridicincta*, Frr. I would call such specimens var. **intermedia** nov.

There is a still paler form than var. *viridicincta*, this is var. *tephra*, H.G., and is pale grey with the green tints missing as well as the pink. This does not appear to have been found in Britain.

A blackish form with the markings on the forewings distinct is var. *aetnea*, Turati. Recorded from Sicily but not apparently from Britain yet. I have one dark example from Cornwall. It is certainly blackish but the markings, though clear, are not "very distinct." It has noticeable ochreous specklings (not dusting, see later note) and is probably close to var. *aetnea*.

Four examples, 2 ♂♂ and 2 ♀♀, have the ground colour olive-green (not deep olive-green as typical forms) but they are much suffused with blackish, the dark markings are not clear, the ochreous stigmata are not distinct and the whole of the forewings are well dusted with yellowish (finely dusted, not speckled as form near var. *aetnea* mentioned above). The reniform, itself not very well defined, is the most conspicuous marking and the general appearance is mixed blackish and yellowish with no definite markings. The form may be known as var. **evalensis** nov.

Another dark ♀ example has a slight purple tinge around the central fascia. The whole of the forewing has a strong suffusion of dark vinous grey, particularly the central fascia and the green colour is almost obliterated. The purplish tinge appears on the hind margin, presumably caused by the vinous grey mixing with some of the bluish

scales described in var. *coerulescens*. There are slight traces of ochreous and greenish near the base. The centre of the indistinct reniform is ochreous, surrounded by whitish and pale grey. The markings are very indistinct and the subterminal line is not so waved as usual. (Var. *evalensis* has yellow dusting and no purplish.) Another ♀ belongs to this form but the purplish is a little less pronounced. Both have a dingy, obscure appearance. The form may be known as var. **atlantica** nov.

A number of specimens are of a paler form which may be called var. **ochracea** nov. The darker markings on this variety, though in most cases reasonably distinct, are not so dark and heavy as in the type form. Neither is the ground colour so dark as the type, it appearing as olive-green, not deep olive-green as the type, and is a distinctive colour from it. This olive-green ground is shot and dusted with ochreous-yellow, sometimes quite pronounced, especially in the basal area of the forewings. Red or pink suffusion is always present in greater or lesser degree, sometimes quite strongly. The stigmata are usually wholly, but always in part suffused pink and yellowish and are not usually very distinct. One ♀ has the hindwings whitish as the ♂. The definite olive-green colour, with patches of yellowish and pink and the slightly lighter general markings give this variety a much lighter green appearance and at once distinguished it from the typical form which appears more drab and uninteresting beside it.

I have nine ♂♂ which have the general appearance of being a paler, slightly marked, distinctly yellow-green form, quite distinct from var. *ochracea* above (which is the intermediate between this yellowish form and the typical form). The form may be known as var. **flavescens** nov. In this variety the ground colour is an even lighter olive green than in var. *ochracea*, nor are the dusky markings so heavy or so dark as in that variety, many of the markings indeed disappearing altogether. All possess slight suffusions of pink but it is not strong in colour nor pronounced in effect. The most distinct feature, however, is a considerable increase in the yellow suffusion over the whole insect. This suffusion is so strong as to make the insects look a very distinct yellow green, rather than the olive colour of var. *ochracea*. This yellowing extends in varying degrees to the thorax, body and hindwings also. The stigmata are almost wholly yellowish but with pink present also.

Rarely there appears a small square ochreous spot on the tip of the apex of the forewings. This is noticed in the typical form and var. *flavescens*.

I have 5 ♂♂ and 3 ♀♀ which in general colouring are as the typical form except for a complete absence of any pink suffusion or scales. The typical form clearly should have this red or pinkish coloration and to be typical any specimen must possess this pink suffusion in addition to the other characteristics. The ochreous scaling is not pronounced. Their general aspect is like the typical form, but lacking the pink coloration makes them look more drab and dull. This form may be known as var. **simulans** nov.

In var. *flavescens* the stigmata are ochreous, with pink mixed; in var. *simulans* the stigmata are largely whitish, with only traces of ochreous. In var. *ochracea* the stigmata are described as usually wholly but always in part suffused pinkish and ochreous; the ochreous colour

predominates. One example of var. *ochracea* has the stigmata, particularly the reniform, largely prominent whitish and distinct. I would call it var. **albin-ochracea** nov. It is a parallel variety to var. *albipunctata*, except that the orbicular is not quite as distinct as in that variety.

The most handsome form is one in which all the markings are clear, there are suffusions of pink, ochreous, blue-green and warm, vinous blackish, all with a strong sprinkling of clear snow-white, giving a dappled appearance not unlike that possessed by *Antitype flavicincta*, F.

The white spots on the costa are clear white and the line before the orbicular and the one after the reniform are clear white, blackish edged. This richly coloured form is by far the most beautiful one, easily surpassing the typical form. I would include in this form specimens having the two lines edging the central fascia either wholly or largely clear white, with snow-white speckling on the costal and hind marginal areas particularly, and richly coloured and variegated. It may be known as var. **splendida** nov.

I should expect to find further variation in this species in the direction of considerable extension of the pink or red suffusion up to an extreme degree. Mr H. J. Turner (*in litt.*) says "a specimen has been taken of a clear purplish-grey form"—presumably caused by a general mixture of the pink with the blue-green colour sometimes found. I would also have expected melanic tendencies to be more pronounced than appears to be the case in Britain.

SUMMARY.

1. Type.—*E. lichenea*, Hbn. Dark green, blackish marked, suffused pinkish and ochreous.
2. Typical form.—Var. *albipunctata*. Stigmata conspicuous whitish.
 Var. *pallido-fasciata*. Pale, wide subterminal band.
 Var. *nigro-lineata*. Wavy, curved, black transverse line across centre of forewings between stigmata.
 Var. *simulans*. No pink.
 Var. *splendida*. Very richly coloured, lined and speckled clear white.
3. Yellower-green.—Var. *ochracea*. Olive-green ground suffused yellowish, lighter markings.
 Var. *albin-ochracea*. As var. *ochracea* but stigmata prominent whitish.
4. Strong Yellow-green.—Var. *flavescens*. Yellow-green, markings very light.
5. Bluish Tinged.—Var. *coerulescens*. Blue tinged, blue centre to reniform.
6. Greyish.—Var. *tephra*, H.G. Pale grey.
 Var. *viridicincta*, Frr. Pale greenish-grey, no pink.
 Var. *intermedia*. Pale green, mixed grey, some pink.
7. Blackish.—Var. *aetnea*, Turati. Blackish, markings distinct.
 Var. *evalensis*. Indistinct, suffused blackish and dusted yellowish.
 Var. *atlantica*. Suffused dark vinous grey, purplish around hind margin.

TYPES AND LOCALITIES.

- Typical form.—7 ♂♂, bred from larvae, P.S.S., Mawgan Porth, N. Cornwall, 1931-32.
- 13 ♀♀, bred P.S.S., Mawgan Porth, 1931-32: 1 ♀, "Torquay, 15/7/02, bred Smallpiece": 1 ♀, "Penmaenmawr, Tait, bred 1904."
- Var. *albipunctata*.—Type. ♀, Mawgan Porth, bred P.S.S., Oct. 1932.
3 ♀♀, Mawgan Porth, bred P.S.S., 1931-32: 1 ♂, "Eastbourne, Sussex, 29/9/33, A.L.R."
- Var. *pallido-fasciata*.—Type. ♂, Mawgan Porth, bred P.S.S., 26/9/32.
- Var. *nigro-lineata*.—Type. ♀, Mawgan Porth, bred P.S.S., 9/10/32.
- Var. *simulans*.—Type. ♂, Mawgan Porth, bred P.S.S., 26/9/32.
2 ♂♂, Mawgan Porth, bred P.S.S., 1932: 2 ♂♂, "St Annes-on-Sea, bred Sept. 1911, W. Yates": 2 ♀♀, Mawgan Porth, bred P.S.S., 1932: 1 ♀, "N. Wales, bred 1907, B. H. Crabtree."
- Var. *splendida*.—Type. ♂, "Penmaenmawr, Tait, bred Sept. 1906."
♂, "Eastbourne, Sussex, 19/9/33, A.L.R."
- Var. *ochracea*.—Type. ♂, Mawgan Porth, bred P.S.S., 3/10/31.
3 ♂♂, Mawgan Porth, bred P.S.S., 1932: 1 ♂, "Plymouth, 1895, Mathews": 1 ♀, "Torquay, bred Sept. 1904, W. Crocker."
- Var. *albin-ochracea*.—Type. ♂, Mawgan Porth, bred P.S.S., 9/10/32.
- Var. *flavescens*.—Type. ♂, Mawgan Porth, bred P.S.S., 25/9/32: 1 ♂ (crippled), Mawgan Porth, bred P.S.S., 1931: 5 ♂♂, Torquay: 1 ♂, E. Cornwall: 1 ♂, S. Devon.
- Var. *coerulescens*.—Type. ♂, Mawgan Porth, bred P.S.S., 27/9/32.
- Var. *viridicincta*, Frr.—1 ♀, "Swanage, Dorset, 1895": 1 ♂, "Portland, bred 1901, J. T. Hyde."
- Var. *intermedia*.—Type. ♂, "Deal, 26/9/19/9":
1 ♀, "Bude, bred 19/9/07."
- Var. *evalensis*.—Type. ♂, Mawgan Porth, bred P.S.S., Oct. 1932:
also 1 ♂ and 2 ♀♀.
- Var. *atlantica*.—Type. ♀, Mawgan Porth, bred P.S.S., 8/10/32: 1 ♀ as first but 22/9/32.
- Var. *trans ad aetnea*, Trti.—♂, Mawgan Porth, bred P.S.S., 9/10/32.

All the above specimens are in my collection. The above details will show that the male appears to be more subject to variation than the female.

FIELD NOTES FROM THE BOSPHORUS.

JANUARY-JULY, 1941.

By MALCOLM BURR, D.Sc., F.R.E.S.

During the winter months the chief interest for the naturalist on the Bosphorus is in the behaviour of four species of gulls, and in particulars of the cormorants, like hundreds of periscopic pterodactyls, and the great crested grebes. These supplement the perennial interest of the *yellowan*, "Souls of the Damned," as the Turks call the shearwaters that perpetually skim the water, flying in long drawn-out flocks

up and down the Bosphorus. They feed in the Sea of Marmora, and roost and nest somewhere on the shores of the Black Sea. It seems an appalling expenditure of energy to make that ten, fifteen or more mile flight to earn their daily bread, and home in the evening. No one, I believe, has ever seen one settle on the Bosphorus, but I have seen a flock reverse and return home. Perhaps they were young birds training for serious business. I gave up trying to estimate their numbers, but during the rush hours they seem to stream along as though coming out of a tap, and one day in about a quarter of an hour well over a thousand must have swept past. I believe they are *Puffinus anglorum*, ssp. *yelkowanus*.

Still, there is insect life to be noticed even in mid-winter. For instance, the black harvesting ant that is so numerous here, I presume *Messor*, is incorrigible. In the quadrangle of Robert College there is a broad, flat expanse of sand, known as the campus. This is trampled under foot by hundreds of students daily, and is soaked with flood rain. Yet on 4th January 1941, after a sodden month, when the campus was a bog, it only required two or three days of sunshine to produce a series of new craters, as the ants resumed their mining operations.

By the end of January another sunny spell brought out clouds of midges dancing in the sun, many small Diptera in the grass, and the harvesting ants were active, and ladybirds appeared.

Apart from an occasional *G. rhamni*, the first genuine sign of Spring was the peach blossom, at the end of February, attracting bees in hundreds. *P. brassicae* and the local form of *Polygonia c-album*, with fewer black spots than our own.

When March was in I thought it time to start tramping the country for *Nocarodes*. This is an interesting and little known Acridian genus occurring in the very beginning of spring in the Pontic area. It is sluggish, apterous and highly localized. The study of the geographical distribution of the species offers many points of interest, and specimens are rare in collections, partly because they occur so early in the year, and partly because they are so restricted. It is necessary to find a colony, when one can secure an adequate series, but those colonies are restricted in area and few and far between. There are problems of biological interest attached to them, and I was very anxious to find a colony. To make a long story short, I tramped over as many miles as I could manage on my occasional free hours, on both sides of the Bosphorus, but without result.

On 23rd March I went for a tramp over the rolling moorland country on the road from Shishli to Buyukderé. What I was able to show for some hours' diligent search was a small black salamander found under a stone, some young larvae of what I take to be *Tettigonia viridissima*, and some specimens of a big, macropterous *Gerris*, skating on a brook-let, that must have hibernated.

On the 30th, Spring seemed really to have arrived. The downs were covered with pretty little waxy white flowers of *Ornithogallum nana*, grape hyacinth, *Muscari racemosum* and an elegant congener, *M. comosum*, when martins and storks appeared in the sky, followed shortly by the sweeping flight of the Alpine swift, *Cypselus melba*, which to my surprise is as domesticated a bird in Istanbul as are the swallow and house martin in England.

Butterflies on the wing at the close of March were a single *Vanessa polychloros*, *Pararge aegeria*, and a *Papilio machaon* that settled on the ground in front of me. I had no net with me, but only a walking stick. So I treated it as a golf ball, with effect. It was smaller and darker than the northern specimens.

Then came mauve primulas, and *Hyla* the tree frog, an adult *Anacridium aegyptium* clumsily crashing across a garden, and, on 1st April, the first kite, which is here a migrant and domesticated bird, as it once was in London. Several pairs nest in the Embassy garden.

5th April was a glorious day, and I tramped several miles looking for *Nocarodes*. I had to be contented with the common *Aiolopus strepens*, which, I suppose, hibernates in the adult state. I stirred a grass snake sunning itself by a hedge, and flushed *Vanessa antiopa*. By the side of a brook *Heodes phlaeas* was abundant, and also *Thecla rubi*, *P. aegeria*, and *V. io*, with *Lacerta viridis* and a smaller lizard.

Later in the month I found very young green *Phaneropteridae* and *Pholidoptera chabrieri*, *Cenocephalus*, no doubt *fuscus*, and what looked like a young *Meconema* on a bramble. On moist ground *Acrydium depressum*, the common southern species, of both the extended and stumpy forms. *Loboptera decipiens* under a stone, the only one I have seen here, and *Acrotylus patruelis* already on the footpaths. If he has been hibernating, why have I not seen him sooner? *Thecla rubi* is common and *L. sinapis* here and there. The countryside was beginning to look lovely, with the pink blossom of the quinces like pale dogrose, and the broom and lavender full of promise of early beauty, marred by great webs of processionary caterpillars.

On 4th May I went for a walk over a hill on the Asiatic side called Chamlidja, which gave promise of interest, though my hopes for *Nocarodes* were fading. More life in the flowers than in the insects. True, I found a handsome *Poecilimon* not quite mature, the white *Cistus salviaefolius*, a stunted prickly juniper, fragrant thyme, St John's wort, and a blue flax which is rather interesting, *Linum scabrum*, with a prickly leaf. Dr Post tells me that it was first described from this district, to which it seems to be restricted. There was also a fine bugloss, coltsfoot without florets, and a creeping, golden *Potentilla*, with here and there one of those rather charming but slightly queer *Muscari comosum*. Of insects other than the *Poecilimon*, I noticed only plenty of *C. pamphilus*, and a burnet with confluent spots, and here and there the green flash of an *Ino*. The only other Orthoptera I noticed were some larval *Platypleis*.

On 10th May I took an excursion to a farm called Alma Chiflik, near Maslak, on the Shishli-Buyukderé road. Here I found a lovely patch of woodland, of oak, plane, *Robinia*, hawthorn and quince. Against a background of the white *Cistus* there was a glorious blaze of golden broom, set off with clusters of *Erica arborea* and deep lavender *Lavandula stoechas*. It was a dazzling sight. Among these beautiful plants I found two brown orchids, *Serapius cf. cordigera* and the less common *Nimodorum abortivum*, both saprophytes. Bird life was not very assertive, yet the song of the nightingales and other warblers was rich, though there seemed a foreign accent about them. What is a nightingale without its jug-jug? The passing cuckoo, too, had a foreign intonation.

Insects were few in this delightful glen. A brownish *Cetonia* and a

small black speckled one crawled upon the flowers; *C. pamphilus* was there, and some tiny Stenobothrids. Most abundant were those evil-looking webs of processionary caterpillars.

On the more open moorland to the east of the road the dominating *Cistus* is the red one, *C. creticus*. There are trees on that wind-swept side only in the dells, where there are clusters of hawthorn and bramble, with here and there a *Cercis*, still retaining flowers. This, the "Judas Tree," was an old friend from the Salonika campaign, for at Stavros on the banks of the Gulf of Orphano I had pitched my camp amid a copse of it, varied with pistachio. But that was in the winter, and it was not till I saw the Spring on the Bosphorus that I realized the beauty of this tree. Why did Judas chose so lovely a tree from which to hang himself? I prefer the Russian tradition that it was from an aspen, which has for ever since trembled at the thought of the association. But, then, I hardly imagine so northern a tree grows in Palestine. In April the branches of the "Judas Tree" are studded with clusters of sessile mauve pea flowers, which are in full bloom before the foliage appears. Then the smooth, clean, rounded green leaves refresh the eye without concealing the mass of mauve behind them. At this season the trip by boat up the Bosphorus is a delight to the eye, when both banks are clustered with charming trees.

It was on this day that, turning over a stone, I found a big, fat dull black spider with a scarlet cross upon his abdomen. I have described how my human impulse overcame my scientific instincts, and incontinently I crushed him, directly I recognised him as a *karakurt*. His bite is certainly extremely painful, and may be fatal.

The only butterflies to be seen here were the usual *C. pamphilus* and a few small dark *Melitaea*.

Another delight to the eye were the flocks of fireflies or, I suppose I should say, flying glow-worms. On dark, moist, warm May and June nights in the darkest corners of the gardens there was a twinkling pyrotechnic display.

By early June the *Poecilimon* were adult. They are handsomer creatures than the earlier stages would lead one to expect. The green is relieved by the transverse black-bands across the tergites, while the elytra, reduced to a mere chirping scales, are white, edged with black and deep red. They are not very common, and I found only one species. In Macedonia they are far more numerous, and I remember one flat down by Mikra where a wide area was blue with *Eryngium creticum*, which we all called blue thistle, and on almost every plant there were two or three *Poecilimon*, and fondly imagined their green harmonized.

Nymphs of *Decticus albifrons* were common enough, and of a plain green Phaneropterid that I take to be an *Orphania*, though I never found the adult.

Fluttering over the ilex shrubs in my garden were several species of *Thecla*. It seemed to me they were *T. rubi*, *T. quercus*, and another suggestive of *T. w-album*. With them were *Maniola jurtina*, to my surprise, as I had always regarded it as a meadow insect, and *Satyrus galathea*, that in England I had never seen away from coombs in the Downs.

By 7th June *Chorthippus* similar to *bicolor* was active and on the wing, while the rather self-assertive, yet shy, *P. chabrieri* was there. This species is about twice as big and strong as our familiar *P. griseo-*

aptera, but with similar bramble-haunting habits, and so proportionately difficult to catch. Most of those that I was able to bottle crept into the house to light, sometimes on the first floor, so at night they must creep high up the trees, and cling to the ground under the bramble thicket only during the day.

On 8th June an excursion to Halki, a pine-covered island in the group that is more famous through Prinkipo, where Trotsky was interned on his escape from Russia. The local pine, *Pinus pithyusa*, is different from the umbrella pine that is so characteristic of the Bosphorus scenery, and more closely related to the Aleppo pine. Halki is a rocky, hilly island, formed of two cones, from which its Turkish name Heybeli Ada, Saddlebag Island. The chief plant beneath the pines was *Asphodelus microcarpus*, already dried and over, an old friend from Macedonian days; curiously enough, the adjoining island of Prinkipo has another species, *A. fistulosus*. The dominant flowers in more open ground are a fleabane and *Scabiosa maritimus*.

Insect life was not prominent. *P. phlaeas*, *Thecla* sp., *Colias croceus*, *P. brassicae*, and *V. atalanta*, *Limenitis*, and a big, brown Satyrid that settled on the trunks of the pines.

Sweeping brought in little but spiders with an isolated female *Poecilimon*. Here and there nymphs of *D. albifrons* and a small *Metrioptera* sp. The only Orthopteron fresh to list was a single little black and white cockroach among the pine needles, *Hololampra marginata*.

On 22nd June I made an excursion across the water to Gök Su, the Sweet Waters of Asia, once a favourite and romantic resort of the rank and fashion of Constantinople. It is a pleasant little valley running up into the hills, with good fertile land, the only place where I have seen a field of artichokes as a crop. Here, in the maquis on the flanks, among *Cistus*, heather and the chermes oak I found *Paracaloptenus brunneri* and lost my lens, an old comrade of some 25 years, which it is impossible to replace out here. A bitter wrench. In thickets of weeds by the fields the usual small *Metrioptera* and a single nymph that looks to me very much like *Bucephaloptera bucephala*, a not very well known species that I used to take in Macedonia.

On the southern flank of the high ground above Bebek I was glad to pick up a couple of *Acrometopa*, a handsome southern Phaneropterid. It was *A. servillea*, that I had occasionally taken in Macedonia, where I was struck by the disparity between the sexes. *Platycleis cf. laticauda* is now adult, but occurs sparingly, and *Ph. chabrieri* is fully grown, as also the self-assertive *D. albifrons*, but in none are the ova ripe, nor are they numerous. Another southern species here is *Oedipoda miniata*, the beautiful pale and pink form. On the higher ground I found the dark central European *O. germanica*, but the usual blue *O. caerulea* is the commonest. *Tylopsis* is ripe, too, common here as everywhere else in the south. One was chewing a petal of *Cistus creticus*.

In cleaning the fatter Tettigonids, I find green matter inside *Decticus*, but no green in *Ph. chabrieri*. I wonder if he eats woody matter.

By now I had seen the year round on the banks of the Bosphorus. My eager anticipations had met with disappointment. The fauna seems so much poorer than in the country behind Salonika, though substantially the same. But here I have not seen a *Saga*, although I got a big one here in 1901, and in Macedonia I found three species, one of which

was new. There are none of the crowds of *Phaneropteridae*, and nothing like the wealth in *Decticids*. Mantids here are few and far between, and I failed to discover a colony of *Nocarodes*. True, at Salonika I did not either, but I did find a rich one of *Tmethis*, which is so closely analogous. Nor did I find *Bradyporus*.

Possibly it is because this is such a wind-swept district. The gales come sweeping down out of Russia over the Black Sea. They tell me that such cold gales sometimes have a devastating effect upon bird life.

And now for the second year!

COLLECTING NOTES.

CORRECTION.—Mr Leeds, in his interesting notes on *coridon* (*Ent. Rec.*, p. 85), states "as in nature *Formica rufa* is an attendant, etc." It is extremely unlikely that *F. rufa* would ever meet a *coridon* larva in nature. That ant does not occur on chalk hills and places where *coridon* lives. Furthermore, I state in *Guests of British Ants*, p. 115, "It must be remembered that none of these ants [including *F. rufa*] . . . would ever be likely to meet the caterpillars of this butterfly." This was after I had introduced these larvae to ants they would not meet in nature. I also show that the ants they do meet "build cattle sheds" around them, etc., and protect them; so his remark "as far as is known" is of no value, as it is very well known what the inclinations of ants are to the larvae of the "blues"; *arion* being the extreme case—see *Guests of British Ants*, pp. 111-118.—H. D. [I agree with Mr Donisthorpe that *Formica rufa* does not normally occur in places where *L. coridon* lives: but, by some curious chance, on 6.vi.1940 I found a dead female of *F. rufa* in my garden at Rodborough, where *coridon* is literally a common or garden butterfly. I do not know of any active nests of *F. rufa* within a mile or two, but *coridon* is abundant on all our open hill-tops and nests of *F. rufa* not uncommon in the district, mostly along the edges of woods where pine-needles are available for the nest, so it is not beyond the bounds of possibility that a *coridon* larva and a *rufo* worker might meet at times.—T. BAINBRIGGE FLETCHER.]

OXYNA PARIETINA, L., AND OTHER TRYPETIDS AT ELTHAM (LONDON, S.E.9).—In a previous article in this magazine (Vol. lii, p. 96, September 1940) I recorded this rare Trypetid as occurring at Stone, near Dartford, Kent. This year I am pleased to be able to record it again from Eltham, some ten miles nearer London. On the 18th June Dr B. N. Blood found a single specimen on the underside of a leaf of *Artemisia vulgaris*, L. (Mugwort), and subsequent sweeping that evening and again on the 20th resulted in the capture of 13 specimens, all ♀♀. Dr Blood and I were searching the *Artemisia* plants at the time for galls of *Paroxyna misella*, Lw., another rare Trypetid. The galls were not at all uncommon in 1941 but were very scarce this year, only three being found. A third "good" Trypetid noticed at Eltham for the first time was *Trypeta falcata*, Scop., of which one ♂ and two ♀♀ were swept on 18th and 20th June. The host plant of this species, *Tragopogon pratense*, L. (Goat's Beard), was not uncommon.

This Eltham locality is a piece of waste ground, the unfinished portion of a building estate, on what was originally orchards and arable fields. It is now covered with the mixed herbage typical of such localities; originally a couple of acres or more in extent, the available collecting area has been much reduced by allotments since the outbreak of the present war. It has proved to be quite a good ground for Trypetids, nine species of this family, in addition to the three mentioned above, having been taken here in the last two or three years. A disadvantage lies in its extreme publicity and consequent curiosity of small boys, as well as some "grown-ups," who cannot understand a man with a net "sweeping," nor why he should quite ignore any butterflies that may be about.—H. W. ANDREWS.

FORM METALLICA OF *P. CORIDON*.—Mr Leeds' article on *L. coridon*, ab. *metallica*, ante p. 84, is most interesting and suggests some problems for research. I wonder whether he has examined the scales of the specimens he deals with? From his description of the upper surface with its rough texture I surmise the scales are abnormal. Apart from *androconia* the scales are normally flat. There are, however, a few creamy-whitish species such as *Polyommatus dolus*, f. *vittata*, and others in which the scales are arcuate. This may account for the colour and in the delicate blue *dolus* there is a tendency to change for its scales are not quite flat but are very slightly arcuate. This leads me to Mr Harris's note, ante p. 87, on a bleached specimen of *M. jurtina*. I have examined several bleached *jurtina* and other bleached species also and have always found badly developed scales, very thin in texture, almost transparent, and arcuate. I remember in one case the scales were nearly tubular.—G. T. BETHUNE-BAKER.

THE EMERGENCE OF *TERRELLIA SERRATULAE*, L. (DIPTERA: TRYPETIDAE).—Mr Niblett's interesting note on the emergence of *Trypetidae* (1942, *Ent. Rec.*, 54: 66) suggests that it may be of interest to record the following observations upon *Terrellia serratulae*, L., which were bred in some numbers from the heads of the spear thistle (*Carduus lanceolatus*, L.) collected by Professor G. D. Hale Carpenter near Cumnor, Berkshire, 15th October 1940. The thistle heads were placed in a tin box and kept throughout the winter in an unheated loft. Early in March 1941 they were placed in a room in which the normal temperature was about 65° F. The first Trypetids emerged on 8th April 1941, and others continued to emerge steadily until 2nd July 1941, after which they ceased altogether. The total number of emergences was 414, of which 221 were males and 193 females (53.3% and 46.6% respectively). These figures compare favourably with Mr Niblett's records of all *Trypetidae* bred by him (1752 males and 1796 females, or 49.4% and 50%). Many *Braconidae* and *Chalcididae* were also bred, the majority emerging between 5th March and 11th April 1941; that is, before the general emergence of the Diptera. Unfortunately, the material was not kept for a second year and no observations could be made on possible retarded emergence in this species.—ERNEST TAYLOR, Hope Department of Entomology, Oxford University Museum, 29th June 1942.

ISCHNODEMUS SABULETI, FALL. (HEM. LYGAEIDAE) IN MIDDLESEX; A NEW COUNTY RECORD.—On 28th June 1942, when collecting at Boston

Manor, Middlesex, I captured a specimen of the rare bug, *Ischnodemus sabuleti*, Fall., by sweeping long grass, reeds, etc., near the banks of the canal. This is a new county record for the species. Butler, in "A Biologia of the British Hemiptera-Heteroptera," p. 146 (1923), gives the British distribution as follows:—Herts.: Hatfield (Janson); Essex: Epping Forest (Newbery); Kent: Folkestone (Douglas); Surrey: Merton (Power); and Berks. (Walker). I took it rather freely at Windsor Forest, first by sifting a swan's nest composed of bullrush stems (*Scirpus lacustris*), and subsequently, in some numbers, by sweeping the herbage around a small lake nearby. Windsor Forest, however, being in Berkshire, was not a new county record.—HORACE DONISTHORPE, Entomological Department, British Museum (Nat. Hist.), 25.vii.42.

DORCATOMA DRESDENSIS, HBST. (COL. ANOBIIDAE) IN CAMBRIDGESHIRE.—Dr H. E. Hinton showed me a specimen of a *Dorcatoma* which I identified as the rare *D. dresdensis*, Hbst. He had taken it on, and has bred it out of, the "Tinder Bracket" fungus, *Fomes pomaceus*, on an apple tree at Linton, Cambs., in May and June 1942. This is a new county record, and also a new fungus for the beetle. I reinstated this species into the British list in 1928 (Donisthorpe, H. St J. K., *Ent. Mo. Mag.*, 64, 196 (1928)), having bred it in some numbers from the "Tinder Bracket" fungus, *Fomes fomentarius*, which I found on a beech tree in Windsor Forest in 1925. Mr Allen has recently bred this species from the same fungus from Windsor Forest. It had not been included in our lists since 1861 (G. R. Waterhouse, *A Pocket Catalogue of British Coleoptera*, 1861). Stephens, 1830 (Stephens, J. F., *Ill. Brit. Ent.*, Mandibulata, 3, 337 (1830)) writes: "very rare," Suffolk and near London; "in a window" (Kirby), Marsham MSS., Cobham, 19.viii.30 (A. Cooper). There is a specimen in the Stephensian collection; also two specimens in the British collection of Coleoptera in the British Museum (Nat. Hist.) taken by the late Dr Power at Esher. These, however, were never recorded as such until my paper in 1928.—HORACE DONISTHORPE, Entomological Department, British Museum (Nat. Hist.).

A NOTE FROM WALES.—So far (31st July) this year has been on a par with 1936, when there were 12 degrees of frost in my garden in Hertfordshire on 29th May, a cold and rainy June, and the wettest July for 44 years. The dearth of larvae is depressing, and the common *Prominents* are as rare as Clifden Nonpareils. Of *Erannis leucophaearia*, so plentiful here last year, I found but a single female (but she made amends for the shortcomings of her family by packing her green pitted eggs into crevices of the piece of oak bark with which I supplied her). The only bright spot in the spring was *Brephos parthenias*. Never before have I seen this insect in such profusion. Between 24th March and 14th April I made many bicycle excursions to remote spots in the hills, and wherever there was a clump of birches there were *parthenias* gathered together. Larvae were to be had in plenty later on; happily, they have more consideration for the entomologist than have the moths from which they spring.

Biston strataria, whose larvae were a plague last year, appeared at the end of March, but only occasionally; the larvae were to be found again on most oaks in May. I collected a few for further observation, and the last of these pupated so late as 24th July. *Diloba caeruleo-*

cephala, equally plentiful last year, was again common, full fed on 14th July (last year, mid-June). In April I noted *Nothopteryx* (L.) *carpinata* on birch trunks, some with dark bands, approaching the ab. *fasciata* of Prout. *Xylina* (*Graptolitha*) *ornithopus* reappeared and laid eggs for me. *Xylocampa* *areola* was very scarce indeed. *Hemerophila* *abruptaria* was found on 26th April, on which day I collected young larvae of *Asteroscopus* *sphinx* from oak (2nd and 3rd instars).

In May the larvae of *Miselia* *oxyacanthae* were abundant as usual on hawthorn, and *Campaea* (*Metrocampa*) *margaritata* fairly frequent on birch, willow, and sallow. *Ellopia* *fasciaria* (*prosapiaria*) and *Ectropis* *crepuscularia*, Dup., in larval and imaginal stages were noted. A ♀ *Cyenia* *mendica* found on the 19th had, unfortunately, been in collision with a motor car. From oak I collected *Amphipyra* *pyramidea*, *Eupsilia* (S.) (*satellitica*) *transversa*, *Hadina* *protea*, *Thecla* *quercus*, and the usual common spring Geometers. A grey *Biston* *betularia*, found among lichen on an oak, laid more eggs than I could cope with, and larvae of the ubiquitous *Gripesia* (A.) *aprilina* were to be seen asleep in chinks up to the end of the month. Other species taken or noted this month were *Ochyria* (*Coremia*) *designata*, *D.* *pudibunda*, *Opisthograptis* *luteolata* (which I, with the obstinacy of old age, persist in calling *Rumia* *crataegata*), *Tethea* *duplaris*, *Selenia* *lunaria*, *Lasiocampa* *quercus*, *Eupithecia* *venosata*, and a few larvae of *Thecla* *w-album*.

On 1st June my wife found *Plagodis* *dolabraria* on an oak, and I collected *Amathes* *lota*, *Plastenis* *retusa*, *Bombycia* *viminalis* and the common "sallows" from spun-up leaves of *Salix* *cinerea*. On the 3rd I noted *Lithina* *chlorosata* (*P.* *petraria*), *Cepphis* (V.) *macularia*, *B.* *temerata*, and *Cabera* *pusaria*. Next day two larvae of *Plusia* *moneta* appeared on *Aconitum* *napellus* outside my study window; they spun up a week later. *Hepialus* *lupulina* appeared on the 4th, *H. humuli* on the 6th, on which day *D. bicruris* (*capsincola*) (a plague here, where it "controls" the campions and lychnis which, otherwise, would swallow up the corn) first appeared. The only remarkable thing I found in June was a full fed larva, on oak, of the totally unexpected *Apocheima* *hispidaria*. *Euclidia* *glyphica* was common in many hayfields this month; its invariable companion, *E. mi*, was not so frequent. *Perizoma* *blandiata* (*adaequata*, Bkh.), *C. rectangulata* and *Boarmia* (*Cleora*) *repandata* were noted. *D. porcellus* flew at valerian.

July moths and larvae were *N. dromedarius* (only one!), *Acidalia* *aversata*, *Hemithea* *strigata*, *S. liturata*, *H. furcata*, *C. elinguaris*, *Euchelia* *jacobaeae*, *Drepana* *lacertinaria*, *Apamea* *monoglyphica* (both grey and chocolate), *Leucania* *conigera*, *Apamea* *secalis* (apparently Tutt's form *didyma*, Esp.), *Acrionicta* *psi*, *Zygaena* *trifolii* or *Z. loniceræ* (who am I that I should distinguish between them?), and, on the 19th, a fine black ♂ *Boarmia* *ribeata* (*abietaria*) on a spruce trunk. Let us hope that the autumn will make amends for a truly "bad" Spring and Summer entomologically.—P. B. M. ALLAN, Newtown, Montgomeryshire.

THE ASPEN GALL GNATS, *PERRISIA* *POPULETI*, RUBS., AND *HARMANDIA* *PETIOLI*, KIEFF., IN CO. DURHAM.—Since we first recorded *Perrisia* *populeti* (*Ent. Rec.*, xxviii, p. 250, 1916) as a new British species it has been rarely noted in this county in any station, and, as a matter of fact,

the aspens in the original Winlaton Mill locality have been eradicated. However, on the occasion of the excursion of the Northern Naturalists' Union to Cornsay on 20th June, its galls occurred in great numbers in company with those of *Harmandia petioli* at Ragpath in the area chosen for our investigations.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

THE FOOD PLANTS OF *YPSIPETES FURCATA* (SORDIDATA) IN THE ISLE OF SOUTH UIST.—Recently I had occasion to investigate the fauna of a small hazel wood situated to the north of Loch Eynort on South Uist. Immediately I commenced to beat, larvae of *Y. furcata* came down freely from the hazels precisely as they would have done in a similar copse at home. From the adjacent plants of the willow, *Salix aurita*, very few examples appeared. However, as I proceeded up the Allt Volagir, that shrub became the favourite, and hundreds, even thousands, of the larvae could have been obtained. On the other hand, its close ally, *Salix atrocinerea*, was practically neglected. Nevertheless, on the higher points of the burn, *S. atrocinerea* formed the only food plant. On a burn not far from the Allt Volagir larvae of *Y. furcata* were knocked out of a hybrid bush, *S. aurita* × *S. atrocinerea*.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

ZYGAENA FILIPENDULAE, L., IN THE ISLES OF RHUM AND SOUTH UIST.—These notes are intended to form a short supplement to those published in the *Entomologist's Record* for December 1940. There *Z. filipendulae* is recorded as rare on the Torridonian Sandstones in the north-west of Rhum. However, in the last week of May this year larvae were not uncommon, and, in fact, just beginning to spin on the Torridonian formations north-east of Loch Scresort.

In the same 1940 publication, the insect is reported as restricted on South Uist to the transition zones between machair and moorland from Howmore to Daliburgh. It may now be stated to occur freely on true moorlands around the Bun-an Uist just north of Loch Boisdale, where *Lotus corniculatus* grows amongst heather. Cocoons occurred freely on heather on 30th May.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

THE FATE OF RHUM PUPAE OF *PIERIS NAPI* REARED IN 1941.—Of a very large number of pupae of the "Green-veined White," reared from spring females captured on Rhum in 1941, nearly two-thirds appeared as a second brood in July and August of the same year. The bulk of the remainder passed the winter safely, to emerge, except for about 14, in the last week of April and the first week of May of this season. On 11th June, a further example appeared, followed by another on 18th June. The others still appear healthy, but seem destined to pass a second winter as pupae.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

VARIATION IN OUTER HEBRIDEAN LARVAE OF *AGLAIS URTICAE*, L.—Whilst the majority of the larvae of this species from Hebridean sources would pass without comment amongst batches procured in England, twice I have noted broods in their penultimate instar which were practically indistinguishable from larvae of *Nymphalis io*. This year, on

the nettles growing along the shores of Loch Boisdale, *Aglais urticae* larvae abounded, mostly in the last instar. Although most of them were quite ordinary in appearance, one brood, which had split into three batches, was coal-black in appearance and bore the usual white dots characterising *Nymphalis io*. Even under a powerful lens the approach was so close to that species that I brought a number of the larvae home. To-day, a few days after changing to the last larval stage, they appear as ordinary examples of *Aglais urticae*.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

LARVAE OF SYNANTHEDON (SESIA) FORMICAEFORMIS, ESP., ON SALIX PURPUREA, L.—In general, as far as Durham and Northumberland are concerned, larvae of this "Clearwing" are restricted in general to the *Caprea* group of the genus *Salix*, that is, to the species *S. aurita*, *S. atrocinerea*, and *S. caprea*. Several times of recent years I have taken twigs of the Purple Osier (*Salix purpurea*), obviously containing larvae, and from them have bred quite ordinary specimens of *Sesia formicaeformis*.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

CURRENT NOTES.

THE *Ann. Report of the Smithsonian Institute* for 1940 just completed has only two papers dealing with Insects. "Insects and the Spread of Plant Diseases" by W. Carter; the subject is briefly dealt with in its various aspects: Fungus and Bacterial, Virus Diseases, Climate and Weather, Controls, Outlook. "The Mexican Bean Beetle (*Epilachna varivestis*, Muls.)," with a coloured plate, is the second paper.

MR F. N. Pierce, F.R.E.S., has just announced that he is about to publish his investigations concerning the "Female Genitalia of the British Noctuidae" as an Appendix to the volume on the males. The edition will be very limited and subscribers in advance can obtain a copy for 15/6, at less than cost price. The author states that the results in conjunction with the males show some surprising affinities which may suggest considerable alteration in classification. To us it seems a great pity to bring out a work of this character under present circumstances, when the circulation must be very limited.

A FURTHER part of the Spanish Entomological Journal *Eos* has been received, Pt. 4 of Vol. xvii, and with a second portion of the Supplement on Spanish Hymenoptera (32 pp.) with illustrations of an imago in each section. There are two plates in Part 1, one of which illustrates an article on the Lepidopteron, *Cochlidion codeti*, Obthr., compared with its close ally, *C. limacodes*, of the latter of which the forms *limax*, Bork., *bufo*, Fb., *fuliginosa*, Stz., *testudo*, Fb., and *sulphurea*, Fb., are described and figured.

THE *Ent. News* for May contains an article headed "Clouds of Butterflies in Mexico: a Study in Butterfly Aggression." This is an interesting record of not only moving clouds but of groups of massed species along the Pan-American Highway for some 235 miles. Quantities were assembled in groups of species and moved in clouds when they were disturbed by passing traffic.

Guen., *Hist. Nat.*, VI, 11 (1852), said that *palliat*a, Fb., was this species; and that Engram. figured several races, 544a, c, d, g.

Splr., *Schm. Eur.*, I, 244, plt. 45, f. 24 (1906), gave a fair figure. He recognized the ab. *unicolor*, Stdgr.

South, *M.B.I.*, II, 3, plt. 2, 4-5 (1908), gave two figures, 4a ♂, 5a ♀.

Warr.-Stz., *Pal. Noct.*, III, 230, plt. 47d, e (1911), gave seven good figures, and treated of 5 forms, including a newly-described one, ab. *nigromaculata*, Warr., with a fig. There were also figs. of ab. *suffusa*, Tutt, ♂ and ♀. He gave the name *magna*, Stdgr., to the very large Japanese form, and in the reference list referred to *Cat.*, IIIed., p. 203 (1901), but this is incorrect, hence it must be *magna*, Warr.

Culot, *N. et G.*, I (2), 75, plt. 51, f. 10-11 (1914), gave two good figures.

Draudt-Stz., *Pal. Noct. Supp.*, III, 189, added the 5 newly-announced forms, and on p. 262 expressed the opinion that ab. *bredemanni*, Wrnk., was "probably a northern form . . . with almost or completely black hindwings."

Barrett described the Variation as follows:—

There is considerable variation in the ground colour of the forewings, from light, bright orange-brown or chestnut to brown-drab, and to deep dark brown with a clouding of chestnut, almost black-brown; also in the degree of distinctness of the white lines or shades on the costa, which sometimes in the female are totally absent, and occasionally very strongly expressed, and this seems to occur without reference to the tone of ground colour.

He records a form "has the basal area to the stigmata spotted and clouded with deep black and further clouding of the same from the middle of the wing to the apex; the transverse lines are also intensified.

Another "in which this variation is amplified by similar black blotches quite through the middle of the wing from base to apex."

Another "of a light purplish-red, and having a very large costal blotch at the second line."

The Names and Forms to be considered:—

affinis, L. (1767), *Sys. Nat.*, XIIed., 848.

ab. *suffusa*, Tutt (1892), *Brit. Noct.*, 21.

ab. *ochrea*, Tutt, *l.c.*

ab. *obsoleta-suffusa*, Tutt, *l.c.*

ab. *obsoleta-ochrea*, Tutt, *l.c.*

ab. *unicolor*, Stdgr. (1892), *Mem. Rom.*, VI, 502.

ab. *nigromaculata*, Warr.-Stz. (1911), *Pal. Noct.*, III, 230, plt. 47d, e.

ab. *magna*, Warr.-Stz. (Stdgr.) (1911), *l.c.*

ab. *affinella*, (Hamps.) Strand. (1915), [*Lep. Phal.*, IX, 192 (1910)],

Arch. Naturg., LXXXI, 164, A, 11.

ab. *affineola*, *l.c.*

ab. *subaffineola*, *l.c.*

ab. *morleyi*, Porr. (1923), *E.M.M.*, LIX, 88.

ab. *nigrata*, Schwd. (1927), *Verh. z.-b. Wien*, LXXVII (82).

ab. *bredemanni*, Wrnk. (1933), *Ent. Anz.*, XIII, 95.

Tutt dealt with: (1) the reddish form with or without reddish streaks, typical; (2) ab. *suffusa*, the dark grey, with or without ditto; (3) ab.

ochrea, the ochreous form, with or without ditto; (4) ab. *obsoleta-suffusa*, with the white costal marks absent; (5) ab. *obsoleta-ochrea*, ditto.

ab. *unicolor*, Stdgr., *Mem. Rom.*, VI, 502 (1892).

ORIG. DESCRIP.—“ They are almost unicolorous dark brownish-grey, without trace of the white costal spots, and give so different an impression from European specimens that the name *unicolor* is very suitable.” Amur.

ab. *nigromaculata*, Warr.-Stz., *Pal. Noct.*, III, 230 (1911).

FIG.—*l.c.*, 47d, e.

ORIG. DESCRIP.—“ Is marked by patches of black scales in the basal area, along the cell and vein 1, before and below the orbicular stigma, beyond the reniform in the angle of outer line, and more slightly before the termen.” In S. Sweden to Morocco and Armenia. Britain.

ab. *magna*, Warr.-Stz. (Stdgr.?), *l.c.*

ORIG. DESCRIP.—“ The Japanese examples are much larger than European.”

[ab. *affinella*, Strand.] Hamp., *Cat. Lep. Ph.*, IX, 192 (1910), described the following form but did not name it.

ORIG. DESCRIP.—“ Forewing with some whitish suffusion beyond post-medial line on costal area.”

This Strand named ab. *affinella*, Strnd., *Arch. Naturg.*, LXXXI, 164, A, 11 (1915).

[ab. *affineola*, Strnd.] Hamp., *Cat. Lep. Ph.*, IX, 192 (1910), described the following form but did not name it.

ORIG. DESCRIP.—“ Forewing much greyer-brown with hardly any rufous suffusion, with or without white suffusion beyond postmedial line.”

This Strand named ab. *affineola*, Strnd., *Arch. Naturg.*, LXXXI, 164, A, 11 (1915).

[ab. *subaffineola*, Strnd.] Hamp., *Cat. Lep. Ph.*, IX, 192 (1910), described the following form but did not name it.

ORIG. DESCRIP.—“ Forewings with patches of black suffusion. Similar to *affineola*.”

Subsequently Strand named it *subaffineola*, Strnd., *Arch. Naturg.*, LXXXI, 164, A, 11 (1915).

f. *morleyi*, Porritt, *E.M.M.*, LIX, 88 (1923).

ORIG. DESCRIP.—“ Head, thorax, body and forewings dark chocolate-brown to almost black; the white costal marks, when present, as in the type, but often, perhaps in most cases, partially or entirely wanting. Hindwings with the basal portion the colour of the forewings, but the outer margin broad and black.” Doncaster district, England.

ab. *nigrata*, Schaw., *Verhand. z.-b.*, LXXVII (82) (1927).

ORIG. DESCRIP.—“ The forewings are as deep black as the hindwings, but the marking is apparent, especially grey marks on the costa.”

ab. *bredemanni*, Wrnk., *Ent. Anzeig.*, XIII, 95 (1933).

ORIG. DESCIP.—“Forewing normally marked and coloured, from grey to brown. Hindwing variable: up to the yellow fringe almost uniformly black, with very slightly less depth towards the base; underside also blackened in the basal half.” N. Friesian Islands. The writer then discusses the variation of this species in these northern islands.

Calymnia, Hb. (1823). Most authors. [*Cosmia*, Ochs. & Tr. (1816-25), Steph., Dup., Frr., H.-S., Gn.: *Caradrina*, Ochs. & Tr. (1816-25), Meyr., Meyr.] *trapezina*, L. (1758).

Tutt, *Brit. Noct.*, III, 22 (1892): Meyr., *Handb.*, 117 (1895): Barr., *Lep. Br. Is.*, V, 317, plt. 224, f. 1 (1899): Stdgr., *Cat.*, IIIed., 204 (1901): Splr., *Schm. Eur.*, I, 244, plt. 45, f. 25 (1906): South, *M.B.I.*, II, 4, plt. 2, f. 8-11 (1908): Hamp., *Lep. Phal.*, IX, 198, fig. 71 (1910): Warr.-Stz., *Pal. Noct.*, III, 230, plt. 47, f. 9 (1911): Culot, *N. et G.*, I (2), 71, plt. 51, f. 13-18, and plt. 51, f. 1 (1914): Meyr., *Rev. Handb.*, 71 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 189 (1935).

Ernst & Engram., *Pap. d'Europe*, VIII, p. 28, f. 546 c, d, f, h (upperside), e, g, i (underside) (1792), gave 7 figures of the imago, all quite good. The red figure, h, shows the underside, i, reddish-ochraceous with the discal transverse line of the hindwing the only marking. The authors give no less than 23 references to the older literature.

Esp., *Abbild.*, IV, *Noct.*, I (1), p. 63, plt. 87, 2-3 (1786-?), gave 2 figures, both rather crude.

Hb., *Samml. Noct.*, 200 (1800-3), gave a figure of a very dark form with which I am not acquainted.

Dup., *Hist. Nat.*, VII (1), 113, plt. 108, 1 (1837), gave a small good figure.

Freyer, *Neu. Beitr.*, III, 57, plt. 232 (1839), gave a figure of a form of the species with a very broad dark brown central band, and *l.c.*, plt. 624 (1851), with a much narrower and lighter brown central band, and ochraceous-grey ground colour, the almost black band having whitish edging to its margins.

H.-S., *Sys. Bearb. Noct.*, II, 223 (1849), said that Frr., *N. Beitr.*, 232, was a combination of two species, *trapezina* and *contusa*.

Guen., *Hist. Nat.*, VI, 9 (1852), referred to Ernst & Engram., 546 a, b, c, d, f, g.

Stdgr., *Cat.*, IIIed., 204 (1901), adopted the ab. *badiofasciata*, Teich., with *obscura*, Auriv., a synonym, and described var. *saturata*, from *Mem. Rom.*, VI, 504.

Splr., *Schm. Eur.*, I, 244, plt. 45, f. 25 (1906), gave a good figure of a brown form. He dealt with ab. *grisea*, Tutt, ab. *ochrea*, Tutt, ab. *rufa*, Tutt, ab. *nigra*, Tutt, ab. *badiofasciata*, Teich., and v. *saturata*, Stdgr.

South, *M.B.I.*, II, 4, plt. 2, f. 8-11 (1908), gave four figures, one of which is a pale almost unicolorous form, and one with much emphasized marking.

Warr.-Stz., *Pal. Noct.*, III, 230 (1911), gave eleven good figures and treated of eight forms. Ab. *carnea*, Warr., with delicate flesh-

coloured shadings, was new with a figure 47 f, and ab. *conspersa*, Warr., with much dark dusting, of which there were two figs., 47 f ♂ and ♀. He said that *badiofasciata* was the *obscura*, Auriv. (1887-8).

Culot, *N. et G.*, I (2), 75, plt. 51, f. 13-18, plt. 52, f. 1 (1914), gave seven good figures showing some of the innumerable aberrations. 13, is typical grey with a red central band; 14, ab. *grisea*, Tutt; 15, ab. *conspersa*, Warr.; 16, ab. *nigra*, Tutt; 17, ab. *badiofasciata*, Teich.; 18, ab. *pallida*, Tutt, and 1, ab. *rufa*, Tutt, very small.

Of the Variation Barrett said:—

Always and everywhere variable in the colour of the forewings, in the distinctness of the transverse lines and central shade, and often in the degree in which the latter is so spread as to give the appearance of a broad central band to the space between the two lines.

One example has "the broad central band referred to of a leaden black, most strikingly set off by the ground colour, which is a pale drab."

A similar specimen, "but its hind margin is also dark."

Another, "with forewings of an orange-red colour throughout, with hardly a trace of the transverse markings."

Another, "having the central band and subterminal line dark brown so that it bears a most curious resemblance to *Crocallis elinguaris*."

Another, "having the forewings brick-red without transverse lines."

Another, "dark smoky-brown, with transverse lines clear white."

Another, "exquisite rosy-pink-brown, with the central band a little deeper in colour, and the transverse lines white."

Others "are dark smoky-brown, with the lines, stigmata and apex ochreous, or exquisitely clouded with bright light pinkish-red."

The Names and Forms to be considered:—

trapezina, L. (1758), *Sys. Nat.*, Xed., 510.

ssp. *exigua*, Btlr. (1881), *Trans. Ent. S.L.*, 182.

f. *badiofasciata*, Teich. (1883), *Stett. e. Ztg.*, XLIV, 173.

ab. *obscura*, Auriv. (1887-8), *Nord. Fjar.*, 161.

ab. *pallida*, Tutt (1892), *Brit. Noct.*, 21.

ab. *ochrea*, Tutt (1892), *l.c.*, 23.

ab. *rufa*, Tutt (1892), *l.c.*

ab. *grisea*, Tutt (1892), *l.c.*

ab. *nigra*, Tutt (1892), *l.c.*

ab. *rufo-pallida*, Tutt (1892), *l.c.*

ab. *nigro-virgata*, Tutt (1892), *l.c.*

ab. *obsoleta-ochrea*, Tutt (1892), *l.c.*

ab. *obsoleta-rufa*, Tutt (1892), *l.c.*

ab. *saturata*, Stdgr. (1892), *Mem. Rom.*, VI, 504.

ab. *rubella*, Krul. (1893), *Bull. Mosc.*, sep., p. 70 [Warr.-Stz., *Pal. Noct.*, 230 (1911)].

ab. *carnea*, Warr.-Stz. (1911), *Pal. Noct.*, III, 230.

ab. *conspersa*, Warr.-Stz. (1911), *l.c.*

ab. *lutescens*, Wrl. (19), *Ver. Gesel. Basel.*, XXVIII, 241 [Drdt.-Stz., *Pal. Noct.*, 189 (1935)].

Tutt dealt with: (1) the whitish or ochreous-grey form, with distinct transverse lines; (2) ab. *pallida*, ditto, with obsolete transverse lines; (3) ab. *rufo-pallida*, ditto, with red central band; (4) ab. *nigro-virgata*,

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SOME REFLECTIONS ON GEOGRAPHICAL CONSTANCY

By E. P. WILTSHIRE, F.R.E.S.

13,820

Much has been written on geographical variation; subspecies and races have been described in detail, and causes have been sought for this variation. Less, however, has been written on its converse, viz., geographical constancy, although geographically constant species are the exceptions, while geographically variable ones are the rule. Surely, therefore, the former deserve attention! A "Journal of Variation" is, paradoxically, an apt medium for the subject, since variability and constancy are, like light and shade, at bottom the same subject.

The term "constant," like "variable," is here used relatively. Constancy and variability are degrees on the same scale.

There are two distinct classes of geographically constant species:—Migratory and Non-migratory. (By "migratory" are meant those whose movements from one territory to another are well known. Although no doubt the migrations of many species are still to be recorded, it is not to be expected that this will ever be possible in the case of the great majority of species occurring in the Temperate and, doubtless, in the other Zones, too.)

It is easy to see why migratory species should not vary geographically: the constant advent of new immigrants prevents any isolation of stock in one part of the species' range, which is, therefore, populated by one and the same "subspecies" or race. This tends to be so with the greatest migrants, such as *Danais plexippus*, *L. boeticus*, *N. noctuella*, but is not the case with the best known migrant of all, *Vanessa cardui*, of which there is a subspecies, *kershawi*, peculiar to Australia.

Thus migration does not absolutely preclude geographical variation, but, even if it did, migratory species would still vary aberrationally or non-locally.

The tendency to geographical variation in migrants, of which I quoted *V. c. kershawi* as an example, denotes that the movements of the migrant are not free over the whole range of the species. Marked geographical variation in a species is, of course, a sign of stability of population. As the migratory tendency increases, geographical variation fades.

But there are some non-migratory species which do not vary geographically. They present quite a problem. Are they perhaps really migrants after all, of whose movements we are unaware? Or is there some fundamental quality in their inherited make-up which causes them not to react to ecological influences in the same way as do most species of Lepidoptera?

I rather doubt whether they can be secret migrants in all cases. To answer the second question, however, is less easy, for to seek the cause of geographical constancy is the same quest as to seek the cause of geographical variation. To judge from some writers, geographical variation is simply the reaction of a species to the particular environment it occupies; each district or country has its own race of a geographically variable species because of the different ecological peculiarities of each habitat. But some other authors treat the question of races as primarily a zoogeographical problem; they seek to explain local forms by postulating prehistoric migrations (presumably

infiltration-movements and not migrations such as we have discussed above), an extremely speculative explanation, and far less susceptible of proof than the ecological explanation. Let me not be thought hereby to deny the value of zoogeographical studies; but I choose to distinguish, with Amsel, between (A) comparative and (B) casual zoogeography, i.e. between (A) the erection of categories based on the known distribution of species to-day, and (B) the explanation of these categories in terms of the past. The latter activity is speculative enough if carried on in anything more than general terms; how far more hazardous is the attempt to explain intra-specific variation in terms of past migrations, etc.!

Yet, in spite of the risks attending the second type of explanation, I feel that it cannot be entirely dispensed with, and that the true cause of both geographical variation and geographical constancy must be sought both in ecological and zoogeographical enquiry.

To students with a laboratory and the time and inclination I suggest a problem to investigate: *find a physical cause or basis for the negative reaction of some and the positive reaction of other species to their environment, as expressed in their facies.*

If this cause or basis be found, a further research should be: *Are the geographically constant migrants constant only because of their migrations, or do they also react negatively to their environment?* I think the probable answer to the latter question will be that some react negatively, some positively.

To sum up my reflections, I suggest that:

(a) There is a physical basis in all species for variation and constancy of a non-local or aberrational kind.

(b) There is a physical basis for geographical variation and constancy (races); that this basis may be different from that of aberrational variability seems probable from the occurrence of some non-migratory species which show non-local variation with little or no local variation.

(c) There is a zoogeographical as well as an ecological cause for geographical variation and constancy in most cases.

(d) The migratory tendency is found indifferently both in variable and constant species. It probably arose in response to ecological difficulties; but in special cases there may be a zoogeographical explanation of the direction and extent of migrations.

(e) The case of migrants which vary geographically raises the question whether the migratory habit evolved subsequently to the differentiation of a species into races, such cases being perhaps due to the incipience or recency of the habit; this question, largely zoogeographical, may be illuminated by a consideration of the distribution of *V. cardui*, which is replaced by a similar but distinct species in S. America, but a subspecies of which occurs in Australia.

Geographical variability, finally, occurs thus most obviously in basically variable species lacking the migratory tendency, and the majority of Lepidoptera belong to this class; geographical constancy, on the other hand, occurs most markedly in basically constant species which tend to migrate. Geographical variability in migrants is due to the incomplete extent of the migrations, but aberrational variability in migrants occurs when a species is basically variable but its migration prevents any marked local differentiation. Basically constant

species that do not migrate to any noticeable extent form a comparatively small class. A few examples for each class are given in conclusion:—

CLASSES OF GEOGRAPHICAL VARIATION AND CONSTANCY.

1. VARIABLE NON-MIGRANTS:—*Melitaea didyma*, *Marumba populi*, *Meganephria oxyacanthae*, *Larentia clavaria*, and most Lepidoptera.

2. CONSTANT NON-MIGRANTS (arranged roughly in order of variability, beginning with the more constant and ending with the aberrationally variable species):—*Hoplitis milhauseri*, F., *Habrosyne derasa*, L., *Myinodes interpunctaria*, Schiff., *Aspilates ochrearia*, Ross., *Acrionicta rumicis*, L., *Harmodia bicruris* = *capsincola*, *Mesotype virgata*, Hufn., *Phragmatoecia castaneae*, Hbn., *Euxoa temera*, Hbn.

3. VARIABLE MIGRANTS:—*Vanessa cardui*, *Celerio lineata*.

4. CONSTANT MIGRANTS (arranged roughly in order of variability, beginning with the more constant and ending with the aberrationally variable species):—*Lampides boeticus*, *Macroglossum stellatarum*, *Deilephila nerii*, *Teracolus fausta*, *Laphygma exigua*, *Cidaria obstipata*, *Sideridis vitellina*, *Sideridis unipuncta*, *Colias croceus*, *Rhodometra sacraria*, *Nomophila noctuella*, *Triphaena pronuba*.

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NOTES ON SOME SOUTH AFRICAN LEPIDOPTERA.

By J. SNEYD TAYLOR, M.A., D.I.C., F.R.E.S.

The following notes are a continuation of those published under the same title in volume iii of the *Journal of the Entomological Society of Southern Africa* (1940). Except where otherwise stated, the material dealt with was obtained at Graaff-Reinet, C.P. The writer is indebted to Mr G. van Son, of the Transvaal Museum, Pretoria, for naming the majority of the species, and to the Division of Botany and Plant Pathology for plant determinations.

SPHINGIDAE.—*Acherontia atropos*, L. (Death's Head Moth).—A larva was obtained near Middelburg, C.P., feeding upon the foliage of *Solanum jasminoides* (potato vine).

Theretra capensis, L.—The adult is commonly seen at light, and the larva has been found feeding upon the leaves of grape vines.

Choerocampa celerio, L.—The larva of this species has also been found feeding upon grape-vine foliage.

LYMANTRIIDAE.—*Bracharoa dregei*, H.-S.—The adult has been taken at light, while the larva has been obtained feeding upon the leaves of geranium in gardens. The cocoon is formed among the leaves of the food-plant.

LASIOCAMPIDAE.—*Gonometa postica*, Walker.—The larva feeds upon the foliage of *Acacia* sp., and the cocoon is formed on the tree.

ARCTIIDAE.—*Diacrisia eugraphica*, Walker.—The adult is common at light, and the larva has been found feeding upon the leaves of *Thunbergia alata*, var. *auranticoa* ("Black-eyed Susan"), a garden creeper.

NOCTUIDAE.—*Tathorynchus vinctalis*, Walker.—The larva has been obtained feeding upon lucerne, and the cocoon was formed among leaves and debris at the base of the food-plant.

Diaphone eumela, Cram.—The larva of this species feeds upon the buds, flowers and fruit, and, failing these, upon the leaves of *Urginea altissima*, a common veldt plant, popularly known as "slangkop." The pupal period may occupy a long period of time, possibly on account of drought conditions. The shortest pupal period obtained was 79 days, while others were eight, fourteen, sixteen and eighteen months (543 days) in duration. Recently (February 1942) several cocoons, formed in the soil in November 1940, were opened, and found to contain living pupae in various stages of development, some being still far from mature. Two species of *Tachinidae* were reared from the larva.

PYRALIDAE.—*Mecyna gilvata*, F.—The larva has been found feeding upon the shoots and twigs of a yellow-flowered broom forming a hedge in a garden in Jansenville, C.P. It was present in large numbers, and had almost destroyed the hedge. Cocoons were found under stones, and in wall crevices nearby.

Terastia meticulosalis, Guen.—Cocoons found behind shutters on a house in Church Street, Graaff-Reinet, and under the bark of a *Eucalyptus* tree at the same place, proved to belong to this species. The original larvae probably came from the tree *Erythrina caffer* (Kaffir-boom), which, Mr van Son informs me, is the usual food-plant, a specimen of which grows on the other side of the street. A careful search was made of shutters and other likely places on this, the east, side of the street, but no cocoons were found. The street is a wide and busy one, and it seems curious that the larvae should seek places for pupation so far afield.

[The larva of *Terastia meticulosalis* is a borer in the young shoots of *Erythrina*; normally it pupates inside its tunnel in a cocoon spun there, usually below the frass accumulated at the apical end of the attacked shoot, which by that time is in a rotting condition. In the case of the cocoons found behind shutters and under *Eucalyptus* bark by Mr Sneyd Taylor, it seems likely that the attacked *Erythrina* shoots had become detached (as by trimming the tree or by being torn off by passing traffic or by wind) and, under such unnatural conditions, the larvae had pupated as described by him.—T. BAINBRIGGE FLETCHER.]

Trachypteryx megella, Zell.—Tough, tubular constructions, about one-and-a-half inches in length, entwined among the thorns of bushes

of *Acacia* sp., were found to contain larvae which belonged to this species. Pupation took place in the tubes.

Loxostege frustalis, Zell.—In *Farming in South Africa*, Vol. xv, No. 176, November 1940, under the title of "The Karroo Caterpillar," the writer gave an account of this species which, from time to time, is so destructive to Karroo-bush (*Pentzia incana*), the most important fodder-plant of the Karroo. In this account, mention was made of the long larval diapause, and, since its publication, more data as to the duration of the diapause have been accumulated. From larvae which entered the soil in November 1939, adults continued to be obtained until January 1941, and the period in the cocoon of forty-six individuals varied from 314 to 424 days, or, approximately, from $10\frac{1}{2}$ to $13\frac{1}{3}$ months. The remainder of the cocoons, formed during November 1939, and from which nothing had emerged, were opened in June 1941, and three of them were found to contain living larvae, some 581 days, or over 19 months; since the construction of their cocoons. The larva of one cocoon, opened 323 days after its formation, made an abortive attempt to construct a fresh cocoon. Another, the cocoon of which was opened after 218 days, pupated 4 to 5 months later, while the adult emerged on the 365th day. Several others, the cocoons of which were opened in June 1940, pupated in the following September and October, the adults emerging towards the end of the latter month. At least one of the larval parasites of *Loxostege frustalis*, a species of *Macrocentrus* (*Bracconidae*), has apparently adapted itself to the long diapause of its host. Several of the adult parasites were obtained after periods varying from 382 to 399 days since the host larvae had formed their cocoons in the soil.

The material from which the above data were obtained was kept under extremely dry conditions.

Loxostege frustalis, although present, did not occur in serious numbers in Graaff-Reinet during the summer of 1940-41. The same applies to the summer of 1941-42, up to the time of writing (February). The few flights of moths, which were observed, were small, and were not followed by heavy or widespread infestations. Both summers were dry, on the whole, and there seems little doubt that climatic conditions play an important part in the incidence of this insect. Dry weather is certainly not favourable to it.

GREEN PUPAE.

By AN OLD MOTH-HUNTER.

On the 27th August, many years ago, I found a green chrysalis. It was suspended in a silken cradle between the leaves of an ash, on a little shoot that rose from the trunk not more than two feet above ground. Having already, at that early age, noted that most chrysalids are green for a few hours after the larval skin has been cast off, I added, in my diary recording the discovery, "evidently just pupated." The following day, however, my pupa was still green, a light grassy green, and so it remained until 13th September, when a male "Dusky Thorn" emerged from it.

Since that far-off day I have bred *Ennomos fuscantaria* many times, and always his pupa remains green. It distresses me. There is something immodest about a green pupa. It is not playing the game. Why do these "Dusky Thorns" which pupate above ground remain green as pupae? Protective coloration? I doubt it: there are plenty of insects which pupate among growing leaves and their pupae behave decorously. For some reason of which I am ignorant *fuscantaria* throws discretion to the winds and remains a toothsome morsel for birds, in appearance at least, throughout his pupal career. It seems very stupid of him. But perhaps the cradle deceives birds, who mistake it for a spider's web and the pupa for a poisonous green spider.

The "Lunar Thorn," who also inhabits ash trees, has not yet made up his mind whether brown or green affords the better protection to a pupa: he pupates, normally, as brown as brown can be; but sometimes he decides to go in for an autumn brood, and then his chrysalis remains green until the moth emerges. *Lunaria* usually cocoons among moss, and here a green pupa might have a better chance to elude prying eyes, so why not stick to green for the normal brood? Are ash trees inhabited by large green spiders which appear only in the autumn when *fuscantaria* and *delunaria* (as the men of science call the autumn brood of *lunaria*) have pupated? What say the arachnologists? Or can the hemipterists (I am thinking of shield-bugs) help us?

Fuscantaria never seems to me to be a very common moth: in fact, I have to work hard to obtain him. His larva is difficult to find: so exactly the colour of an ash leaf that the quickest way to find him is to draw the leaves gently through one's hand. He reclines along the petiole on the under side, and there he remains by day, in wind and rain. At night he moves very little, eating holes in the leaves round about him and departing to fresh pastures only when he judges that the extent of his meals has endangered his camouflage. I can find no record in my diaries of ever having found the imago otherwise than at a street lamp, which shows what a duffer I am. But I find the larvae every now and then, as well as the pupa.

Tetralunaria, the "Purple Thorn," is a most lovely thing. One comes across him in the moth state much more readily than as a larva. He does not disdain telegraph poles. He sits on the top of a hedge. I once found him on the trunk of a mighty Tulip Tree, a veritable *Liriodendron tulipifera*, up which he had crawled to expand his wings. A rare tree for a larva to feed on. But then, the "Purple Thorn" is a rare moth, at least so far as his beauty is concerned. And on the 22nd of April I discovered him in an alder bush. We were passing, my wife, daughter and I, a clump of tall leafless alders. I stopped. "There," said I, "is a 'Purple Thorn'." I pointed to a large male *tetralunaria* doing his best to imitate a dead leaf, on the far side of the bush, about seven feet from the ground. My wife can give me points and a beating any day at spotting moths at rest: she once showed me—or rather tried to show me; for I could not see it for the life of me and indeed hardly believed her until I had the insect in a box—a *socia* asleep in a deep crevice of oak bark ten feet from the ground. My daughter has the keen eyes of youth. They peered and peered. In vain. Then I pushed my way through the branches, secured my "Thorn," and exhibited it

in a glass-bottomed box. "Don't you ever dare to complain about your eyes again," said my daughter.

But it really wasn't much of a feat. There were no dead leaves on that bush, and the "Thorn," though five or six feet from me, was exhibiting the unmistakable wing profile of his race. It was quite easy. And now that he is set he measures 42 mm. across his front wings.

His larva is, I believe, polyphagous. Says Barrett, he "will eat almost all kinds of deciduous trees and shrubs—raspberry, bramble, honeysuckle and cotoneaster." I have found him on none of these plants, but, every now and then, on alder, oak, birch, and once on ash. So he can put up with almost any kind of food. Yet for all that I have never found him a common moth, at least in those parts of the kingdom wherein I have shouldered the pill-box.

As a larva he is, of course, quite impossible. The one I found on an ash was such a perfect twig that he put the real twigs to shame. He out-Heroded Herod; he was *plus royaliste que le roi*. He knew much better than the tree what an ash twig really ought to look like. Indeed, it was a marvel that he did not burst into leaf. So proud was he of his mimicry that he refused to budge and I had to stimulate his backside with a grass-stem. Protesting loudly, he at last consented to enter the box. Inside it he lay inert for a moment or two; then, realizing that something had gone wrong, he rushed around looking for a twig to imitate. Finding none, he gripped the petiole of a leaf with his claspers, swayed to and fro, chattering with rage; then sulked all the way home. But he made a most lovely moth, and that was the main thing, wasn't it?

Of *lunaria*'s larva I say nothing at all: his sole object in life is to outdo *tetralunaria*, and he usually succeeds. If birds, wasps and other predaceous animals hunted their meat by sight alone the "Lunar Thorn" would be one of our commonest insects. He is *sui generis*, he is unique, he is an abnormity, a *lusus naturae*. And he is the forerunner of a very lovely and not too common moth.

ABERRATIONS AND GYNANDROMORPHS OF *EPIONE VESPERTARIA*, FB.

By E. A. COCKAYNE, D.M., F.R.C.P.

Epione vespertaria, Fb., ab. **alba**, ab. nov. Female. The straw colour of the wings, head, thorax, abdomen, and legs is replaced by white. The absence of straw-coloured scales gives the border a redder tint than usual.

Type. Female. York, 1892. Bred by R. Dutton. Crabtree Coll. "Pink var." is written on the label, so possibly it had a pink flush when newly emerged, but no trace of this remains.

Paratype. Yorks. Bred. B. S. Harwood Coll.

Of ab. *fulva*, which I described and named (*Ent. Record*, 1934, **46**, 118), I now possess five specimens.

(a) The type. Strensall Common, York, 1917. A. Smith.

(b) Labelled "Purchased at the Prest Sale, 1882." Presumably this is the specimen depicted on a coloured plate (*Entomologist*, 1878, **11**, 170, pl. 2, fig. 8). This was taken at Sandburn, 13th July 1874, by W.

Prest. If I am right in its identification, the red-brown ground colour in the plate is not bright enough and the border is too black. It passed into the S. Webb collection and was figured by Barrett, pl. 298, fig. I got it from the B. S. Harwood collection.

(c) Sandburn, York, July 1875? Presented by R. Anderson, Coney St., December 1897.

(d) Sandburn, 1870? Taken by S. Walker.

(e) Sandburn, 29th July 1883. Taken by S. Walker and said by him to be the finest example he or other York collectors have seen.

The last three are from the S. Walker collection. No corresponding form appears to be known in the female sex.

William Hewett records the capture of a male at Sandburn in July 1889 (*Entomologist*, 1890, **23**, 19), and at the end of his note is an editorial comment saying "This variety is more commonly bred than captured: some years not unfrequently (sic)." On p. 101 of the same volume Samuel Walker says he has never heard of one having been bred and that all the York collectors agree that it is extremely scarce. He goes on to say that in Prest's note of 1878 "mention is made of several others taken in previous seasons near the same spot, pointing to a hereditary form. There is one in the Allis collection in the Yorkshire Philosophical Society's Museum in this city (York). I believe Mr Anderson and Mr Jackson have both captured it. Mr Prest said all the examples had been taken close to a hillock at Sandburn and I believe Mr Hewett's specimen was captured within a few yards of where the others were taken." Evidently Mr Anderson gave his specimen to Walker a few years later. At the end of Walker's remarks the editor disclaims responsibility for saying the aberration is taken not infrequently and says the comment was written by J.T.C., which are Carrington's initials. There is little doubt that Walker is correct in saying that the form is hereditary and it will probably prove to be recessive.

I have three gynandromorphs of *E. vespertaria*, only one of which has been described.

(a) York. Bred June 1893. R. Dutton. This is recorded, but not described (*Entomologist*, 1894, **27**, 78, and *Ent. Record*, 1894, **5**, 13). Both antennae are shorter than normal, the right with shorter pectinations on both sides than a male, the left with short pectinations on the proximal two-thirds and with the distal third almost simple. The wings on the right side are shaped like those of a female with female borders and coloration on both surfaces. The wings on the left side are shaped like those of a male with male borders. On the upper surface the colour and striae are male, with the exception of a streak of female colour, on which striae are absent, running from base to border and occupying the whole width of the discoidal cell. The under surface is female. Genitalia: both lobes of the ovipositor are present but malformed, and on the right there appears to be a valve.

(b) Bred from larvae swept at Sandburn, 13th July 1901, S. Walker. This is a small specimen. The right antenna has long pectinations in the proximal third and short ones on the distal two-thirds; the left antenna has short pectinations throughout. On the upper surface both wings on the right side appear to be female and on the left side male. On the under surface the right forewing is female with the exception

of a stripe of male colour with striae lying between the discoidal spot and nervure 1, running from base to termen and so including the dark border.

On the right hindwing there is a small stripe of male colour running along 8 from the base to the dark border and another male stripe between 5 and 6 running from the discoidal spot to the border. There is a broad piece of male coloration with striae running from the base to the border and filling the space between the median nervure and 1. The rest of the wing is female. The under surface of both wings on the left side appears to be female. Genitalia: both lobes of the ovipositor are present but malformed and apparently fused, and there seems to be a small male valve on the left.

(c) The specimen figured in the *Entomologist*, 1878, **11**, 170, pl. 2, fig. 9. Saltburn, captured 22nd July 1877. G. C. Dennis. This specimen passed into the S. Webb collection and was figured again in colour by Barrett, pl. 298, fig. 2c. Barrett, however, does not mention its origin. I obtained it at the sale of the B. S. Harwood collection. Both figures show the pectinations of the same length on both antennae, but the text says correctly that those of the right antenna are shorter. Barrett's description of the upper surface is not quite accurate and he does not describe the under surface. On the upper surface of the left forewing all the area between the costa and the discoidal spot is male, and that between 1 and the inner margin is also male, and there are a few striae between 1 and 2. The shape of the wing and dark border are male. On the right forewing all the area between 1 and the inner margin and most of that between 1 and 2 are male. There are also a few male striae between 2 and 3, and between 3 and 4, and a streak of male coloration running along 5 to the discoidal spot. The remainder of the wing surface comprising the greater part, its shape and dark border are female. Both hindwings are largely male, but there are some small streaks of female coloration. On the under surface the right forewing is male with the exception of a streak of female colour running from the discoidal spot to the border; the left forewing is male with the exception of the costal part, which is of female coloration and devoid of striae. This female part almost reaches 5. Both hindwings are almost entirely male. The abdomen and genitalia are male with normally developed valves.

In Schultz' list of Gynandromorphs of Palaearctic Macrolepidoptera only one is mentioned and that is the specimen bred by R. Dutton in 1893.

COLLECTING NOTES.

MELANIC PROCUS LITEROSA.—The melanic aberration named ab. *obscura* by Mr A. J. Wightman in the September number of the *Entomologist's Record*, p. 93, appears to be the same as ab. *aethalodes*, Richardson, described in the *Entomologist*, 1940, **73**, 136; ab. *obscura* therefore becomes a synonym of ab. *aethalodes*.—E. A. COCKAYNE, Merstone, Tring.

NOTES ON VARIATION FROM THE WORTHING MUSEUM COLLECTION (*Continued from p. 76*).—*C. pamphilus*.—There is a considerable number of

this species from England, extending from the Lake District and Wither-slack in the north-west to Sussex in the south-east, and from Durham in the north-east to Bude in the south-west. There are two broods from the Cotswolds in which there is very little difference in the upperside of the ♂s; in both there is great variability in the breadth and blackness of the border and in both that of the ♀s is light. In the first brood the underside of the ♂ shows a dark base with a very short white band, the ♀s have a lighter base and a much broader and longer white band. In the second brood the underside of the ♂s is much like that of the ♀s of the 1st brood. In the two broods from the N. Downs the ♀s of the 1st are large, the border in both sexes varying as in the Cotswolds; while the specimens of the 2nd brood are small with a much darker underside than those from the Cotswolds, one ♂ is very pale. From the S. Downs both broods are small; in the 1st brood the white band on the underside hindwing barely reaches the centre even in the ♀, and in the 2nd generation the band is broader but not longer. In a pair of the first brood from Chiddingfold (Surrey) the ♂ has a very broad dark border on the upperside, especially on the hindwing. From Wolford (S.W. Warwickshire) only the Spring brood is represented; these, as might be expected, are very like the Cotswold specimens, but the ♀ has scarcely any border on the upperside. From Royston, the New Forest and the Bude district only the 2nd brood is represented. Royston shows a very small race, not otherwise remarkable; those from the New Forest, on the other hand, are very large, the border not very dark, the underside hindwing being very dark in both sexes, the white band in the ♂ being very narrow. The Bude specimens are rather large, the ♂s with a very black and broad border, that of the ♀s being narrow and light. From the Chilterns there are only 2 ♂s of the 2nd generation, with a border of moderate size and depth of blackness, the white band on the underside being rather more marked than in most other specimens. With regard to those from the North, those from Wither-slack have their border of a light grey and rather narrow, the white band on the underside being conspicuously small; those from E. Durham have a broader and darker border, the white band beneath being very short and narrow, strongly contrasted with the ground colour. Those from the Lake District have a broadish and very dark border, the ♀s having a very light underside with the white band short and narrow, but without the contrast of the Durham specimens. A few from Kinghorn in Fife have a light border almost absent in the ♀; the ground colour of the underside hindwing is dark with the white band short but broad.

In Belgian specimens the border varies both in depth and blackness, but that of the ♀ is darker than in any English specimen and the tone of the upperside is deeper, the white band below being very short and narrow.

From France come very large ♀s from Samoussy, Plouharnel, Aix-les-Bains, Mt. Revard and the Col du Granier, while those of the 2nd brood from Digne are scarcely larger than the ♂s. The underside of Plouharnel ♀s have a very broad band of a yellowish colour, while that of the ♂s is short and narrow. There is a pair of a 3rd generation from Monterfil (near Rennes), small, with pale borders. The border of ♂s from Aix-les-Bains is very broad.

Swiss specimens from the Rhone Valley are all larger than English ones, especially the ♀s, and are practically without any white on the underside. One ♀ has a double eye-spot on the underside forewing. From Altmatt the ♀s are smaller, with pale border, and show little white on the underside. From Wesen the specimens have a darker ground colour on the upperside with a much suffused border. A ♂ from Fusio has a very broad border on the upperside and scarcely any white on the underside. One ♂ from Norway is about the size of English ones; those from Finland are also like the English ones but have much less white on the underside. The 1st brood from Italy are all very large, especially the ♀s; those from the Lido have a very dark and sharply defined black border on the upperside; those from Paraggi on the Portofino peninsula have no white on the underside, except one which shows traces of it; in ♂s from the Lido there is also no white or only slight traces, while in the ♀s the band is either short or narrow and yellowish in colour. Specimens of the 2nd brood are smaller and generally have the border of the upperside suffused on the hindwing, one ♂ from Assisi remarkably so; ♂s from Orvieto have a very dark border, and ♀s from there and also from Rome are large, with a pale narrow border on the upperside. September specimens from Perugia and Fiesole are small, the ♂ unicolorous on the underside hindwing, the ♀ with a broad yellowish band. From Corsica the ♂s have a very broad black border, narrower and greyer in the ♀s. There are 2 ♂s and 1 ♀ from Hintertarten in the Black Forest; one of the ♂s is without any eye-spot on the upperside and the ♀ also almost without. The ♂s from Oberbozen in the Tyrol have a very broad black border, narrower and greyer in the ♀s, one of which is almost without either border or eye-spot. In the Greek specimens the 1st generation shows rather large ♀s. The undersides vary both in tone and in the length of the band, which, however, is always short and sometimes absent; a few have a broad border on the upperside, but it is not general. The 2nd and 3rd generations are small and very neat looking, with sharply defined border; one ♂ has spots on the upperside hindwing.

C. typhon (now called *tullia*).—There is at present a row of upper- and a row of undersides from Witherslack of the very dark form *philoxenus*. The ♂s on the upperside vary both in the number and the distinctness of the eye-spots of the hindwing. There are generally two or three but they vary from 0 to 5; some are barely visible, but mostly very distinct and conspicuous. On the forewing there is generally one, but rarely two appear. In the ♀ uppersides the contrast between the colour of the fore and hindwings varies from being very slight to being very conspicuous, but darker hindwings are always accompanied by rather darker forewings. The spotting varies just as in the ♂s. On the underside the spotting is very conspicuous. The forewing generally has one spot but sometimes 3; there is no case of 2 spots in the ♂ and only one in the ♀, but the costal spot has sometimes 2 pupils in the ♂. The hindwing has generally 6 spots, but one ♂ has 5. The costal spot on both wings is inclined to be lanceolate. The Scotch specimens (*laidion*) are very pale and with very little spotting, often without any in the ♂; the ♀ has always one at the costa of the forewing, the ♂ rarely. On the underside there is nearly always a costal spot on the forewing,

rarely any indication of one on the hindwing in the ♂ but rather less rarely in the ♀.

There is a series of Swiss specimens from Altmatt in the bog-land near the lake of Zurich, rather larger than the English, and with ♂s and ♀s of the same shade of colour, half-way between that of the English and Scotch specimens, with no spots on the upperside of the ♂s and only indications in that of the ♀s; there is much more spotting on the underside, but the spots are generally small and inconspicuous. Those from Gimel on the Swiss Jura above the lake of Geneva show rather lighter ♀s. The upperside is like those from Altmatt, but the underside is much less spotted except in one ♀. There are also a few from Wesen on the Walensee, much more spotted on the underside. Specimens from Hinterzarten in the Black Forest are large and slightly darker than the Swiss, very rarely with any spots on the upperside, but occasionally there is a costal spot on the forewing and in the ♀ slight indications on the hindwing. The underside is more spotted than the Swiss specimens, but the spots are inconspicuous; there are generally 2 on the forewing, in one case bipupilled, and any number up to 6 on the hindwing but they are very small. There is one specimen from Finland, small and spotless on the upperside and almost so on the underside; I fear I may have passed some over as *C. iphis*, which is very common there and is of much the same size and colour.—(To be continued.)—Rev. G. WHEELER, M.A., F.R.E.S.

ASSEMBLING SCENT AND MISCOUPLING IN *A. VILLICA*, ETC.—Dr Kettlewell's most instructive remarks in the May number on "The Assembling Scent of *A. villica* and *P. plantaginis*" at once suggest the explanation of miscouplings in other species which are presumably unfertile and of which there are doubtless many records to be collected.

I recall observing an attempted copulation between *Phragmatobia fuliginosa* and *Tyria jacobaeae* in a wild state on Fritton Warren, Suffolk, about twenty years ago. I do not recall which species was the female. I also recall being told that *Taeniocampa pulverulenta* (if my memory fails me not) is liable to such miscouplings.

Perhaps more constant English residents than I can oblige with similar records. I do not know whether the above-mentioned species have been recorded, though Dr Kettlewell in his last sentence implies that there is somewhere a record of such occurrences.—E. P. WILTSHIRE, F.R.E.S.

AGROTIS CORTICEA, HB., FORM NIGRA-VIRGATA, TUTT.—On page 64, Vol. ii, lines 4-7, in *Brit. Noct. and Vars. Supp. Notes*, by Hy. J. Turner, we read: "On page 63, *Brit. Noc. and Vars.*, Tutt refers to his *nigra-virgata*. It seems that he should have written *brunnea-virgata* as the parallel form in the 'black' ground forms to that in the reddish-brown ground forms."

I do not think this explanation can be accepted, because form *brunnea-virgata*, Tutt, and form *obscura*, Frr., are not parallel forms.

Tutt refers to his form *nigra-virgata*, but has not described such a form, it is true.

Years ago I wrote "read *sincerii*, Frr.," against this reference by Tutt to his *nigra-virgata* in my copy of *Noct. and Vars.*, and I think the explanation is certainly as follows.

In his table of *corticea* forms, *Brit. Noc. and Vars.*, Vol. ii, page 61, Tutt had called A4 *nigra-virgata*, which would have been an excellent name for the form, indeed the obvious one for a form "Basal and outer area pale grey, central area black," and in writing the subsequent notes he noted under *obscura*, Frr., that it was a parallel form to his *nigra-virgata* (A4), but in checking up before publication he found that he had been forestalled by Freyer, whose ab. *sincerii* was just this form.

Tutt then deleted his name *nigra-virgata* and his description of it and wrote in *sincerii*, Frr., later quoting Freyer's description; but, forgetting his reference to this form under *obscura*, Frr., as his *nigra-virgata*, failed to make the necessary alteration there.

If we read *sincerii*, Frr., instead of *nigra-virgata* on pages 63-64 (*Brit. Noct. and Vars.*, Tutt), the matter will be in order, as *sincerii*, Frr., is a parallel form to *obscura*, Frr., differing principally in ground colour as Tutt says.—A. J. WIGHTMAN, "Aurago," Pulborough.

C. SCROPHULARIAE IN THE BRITISH ISLES.—I was interested by A. J. Wightman's remarks about *C. scrophulariae* on p. 130, *Ent. Rec.* (Dec., 1941), though I think that they might better have had the title "Occurrence of *C. scrophulariae* in England" than "Phenological Classification of Palaearctic Lepidoptera." When including the "disputed example" in my article with the latter title (and I might indeed have omitted it without prejudice), I wondered whether it would provoke a discussion of *scrophulariae*'s English record, and indeed hoped it would. I took care to dissociate myself from the view quoted from South.

Scrophulariae has good specific rank and is regularly obtained by entomologists in France and Belgium, chiefly in the distinct larval stage. The male genitalia of this group, on the other hand, do not always show specific differences clearly, and are even in some cases variable, I understand. Perhaps Dr Cockayne will sum up the question for us. Alas, one cannot now consult the Paris entomologist, M. Charles Boursin, one of whose earliest specialities this genus was, and with whom I remember discussing the occurrence of *scrophulariae* in Europe.—E. P. WILTSHIRE.

ABUNDANCE OF *NYMPHALIS IO*, L., AND *PARARGE MEGERA*, L., IN THE CARLISLE DISTRICT.—The steady increase in numbers of the "Peacock" butterfly in this district, which has been observable for the past 5 or 6 years, after a long period of almost total absence, seems to have reached its peak in 1942. In June the larvae were present in hundreds in the nettle beds around the city, far outnumbering those of *Aglais urticae*, L., which was, as is usual here, common enough. Later the butterflies were so numerous that they added much to the floral amenities of gardens and the rougher herbage of roadsides and open woods. On the other hand, *Vanessa atalanta*, L., has been comparatively scarce and *V. cardui*, L., almost absent.

Another butterfly to be remarkably abundant this season is the "Wall Brown," especially in the second brood in August and early September. It is invariably a fairly common insect in this district, particularly on the west side of the city and towards the Solway area, but this year it has occurred in much greater numbers than I have previously known, frequenting hedge-banks in lanes, open spaces on

moors, and many being noted in the streets of the city on sunny days.—F. H. DAY, 26 Currock Road, Carlisle, September 4th, 1942.

ACRONICTA ALNI IN SURBITON, SURREY.—On the evening of the 12th August, I took a larva of *A. alni* from a pear tree in the remains of an old orchard in our district. It was resting fully exposed on the surface of the leaf, and almost full fed; in fact, it commenced to spin up a day after, but in the meantime had been eating pear with which I had provided it. I supplied it with a short piece of dead wood, but although it commenced to attack this it apparently changed its mind and spun eventually between two of the leaves. I thought this might be of interest as there is a great amount of traffic of all kinds close to where I found it.—J. C. WAINWRIGHT, 9 Priory Road, Hook Road, Surbiton, Surrey.

SUBSTITUTE FOODPLANTS.—With reference to Messrs Allan's and Donisthorpe's letters, on pp. 63 and 87, *Ent. Rec.*, 1942, under the heading "Substitute Foodplants," it is surely quite usual to find non-polyphagous larvae or other insects ready to eat any of a number of closely related genera (but not usually all genera of a large family) of plants. Figworts and mulleins are an excellent example of such alternative pabula; so are privet, lilac, and snowberry; so are birch and alder; so are poplar, willow and sallow. It must be some ancestral essence, capable perhaps of chemical analysis, that makes these alternatives welcome to the palate of one insect; the texture of the leaves of a plant is the merest detail compared with something that has its roots in the common associated evolution of plant and insect.

Before leaving the subject of mullein and figwort, and the mullein and figwort sharks (a fascinating group of moths), let me briefly record here my own observations of these "substitute foodplants."

C. verbasci, L. As a schoolboy I found larvae at Cheltenham on *Scrophularia aquatica*, which readily ate *S. verbasum* in captivity and *vice versa*.

C. barthae, Bours. The larvae are only found on *S. xanthoglossa* in Syria and a similar or identical species in the Elburz; these are foodplants of a dry habit and knotty aspect. In both these districts certain kinds of figwort with the aspect of *aquatica* are to be found by streams and rivers; *barthae* larvae readily eat these in captivity but the egg is never laid on them, to my knowledge. If hungry and offered nothing better they will also eat *verbasum* in captivity.

A new species in this group from the Firuzabad district of Fars (S.W. Iran), which I have bred and hope to describe shortly as *C. faucicola*, is only to be found on a fleshy species of *Scrophularia*, which only grows on vertical cliffs. At higher and lower altitudes, and in different biotopes in Fars, other species of figwort and mullein are to be found freely but they do not harbour this species, which will, however, eat them in captivity if deprived of the favoured kind.

This last example of specialization is doubtless due to ecological causes, the alternatives or "substitutes," which are acceptable in captivity, not growing in the conditions to which the species has, by close association with its proper foodplant for thousands of years, become habituated. But I see no ecological reason why *barthae* should not feed

on *verbascum* on dry ground, though it is easier to imagine ecological objections to an aquatic figwort as a wild foodplant for this species, which seems to pertain to steppe mountains. *C. verbasci* and *C. lychnitis*, which will eat several foodplants in the wild state, range over most of the Palaearctic zone, whereas the species that specialize on one kind of *Scrophularia* have a restricted range.

Relevant are the foodplants of *Melitaea trivia*, a widely distributed desert and steppe butterfly; in Syria and N. Iran I have seen its larvae on *verbascum* but in Fars (S.W. Iran) on a dry-growing species of *Scrophularia*.—E. P. WILTSHIRE, Basra, Iraq.

AN UNUSUAL FOODPLANT.—On 7th July last I found eight young larvae on the underside of the lowest leaf of a large *Onopordon acanthium*, L. They were about 3 mm., yellow and translucent, with a few long black setae on each somite, and had started to eat the lower parenchyma. I could find no eggshells. The lens showed them to have Arctiid characters, so I boxed and proceeded to rear them on *Onopordon*. In the second stadium they ate the upper parenchyma as well. On 22nd July, when they moulted for the second time, they declared themselves to be *Cynia (Diaphora) mendica*, L. Thereafter six of them deserted *Onopordon* for *Plantago major*, L., two continuing with the original foodplant throughout their third stadium. They grew well and moulted for the last time on 2nd August, pupating on 10th-12th August. P. B. M. ALLAN, Newtown.

CHRYSOPHANUS (HEODES) PHLAEAS, AB. ALBA, TUTT.—A good example of the above was taken near Burbage, Leics., on 1st September. The abnormal summer and, for the most part, wet August may account for the appearance of such rare forms.—D. P. MURRAY, Leicester.

CURRENT NOTES.

In the *Ent. News* for June there is a short note on the possibility of the vectors of disease being spread by airplanes. It is reported that a male of one of the carriers of sleeping sickness was found in an airplane going from Africa to Brazil in November 1941.

The same number of *Ent. News* contains further notes on the Clouds of Butterflies observed assembling on the roads of Mexico. The species noted include *Victorina steneles* ssp. *biplagiata*, *Colaenis julia*, *Achlyodes thraso*, *Anaea aidea*, 3 species of *Eurenia*, *Physiodes* and *Chlosyne* species, *Precis lavinia*, and others. In nearly every case those captured were males. In the July number a summary of the observations was given.

A SEPARATE.—“The Biology and Natural Control of the Larch-shoot Moth, *Argyresthia laevigatella*, H.-S.” has been received from Dr B. P. Beirne. Of the 20 pp. 5 are occupied by numerous figures illustrating the life-history, structure and damage caused by the larvae; interesting facts about its natural enemies and the control they afford are discussed. (*Econ. Proc. R. Dublin Socy.*, Vol. 3, No. 11.)

"MESOPOTAMIAN DESERT LEPIDOLTERA" is the title of a separate from E. P. Wiltshire of Basra, reprinted from the *Bombay Nat. Hist. Socy.* This interesting account of a very specialized area is divided into sections: 1. The Desert itself, described in a general way, giving the geographical, geological and to a degree the botanical aspects of the area, and explaining the conditions under which the fauna (lepidopterous) has to live. 2. Descriptions of all localities which have come under the notice of the author mainly by his personal observation. 3. A list of the species recorded with special notes on each as to its variation, abundance, scarcity, etc., mainly of Macro-lepidoptera. A very useful piece of work which wanted doing, not merely as a record of captures but to give an insight into the ecological existence of life in an area very restricted in its availability for the existence of frail natural objects such as the Lepidoptera.

CORRECTIONS.

p. 93, line 1: for *Procrus* read *Procus*.

p. 87, Note on *S. pavonia*: Omit all references to "D.S.T." and put the times 2 hours back.—A. F. L. BACON.

SOCIETY.

The South London Entomological and Nat. Hist. Society on October 10th held their Annual Exhibition of Aberrations and of Special Captures during the present season as a full record of all worth noting in all Orders. The meeting was again very successful. There were about 50 exhibitors and the meeting was attended by considerably over a hundred members and friends. Visitors came from afar: Cheshire, Devonshire, Oxford, Salisbury, Folkestone, The Fens, Tonbridge, Gloucester, etc. The sun condescended to shine as last year and all went off quite pleasantly. When the Report is published it will be seen that many fine forms were shown and long varied bred series.

Articles, Collecting Notes, and Current Notes are much needed just now. The November number will be less, but will have a plate.

ditto, with a black central band; (5) ab. *obsoleta-ochrea*, bright ochreous, slightly reddish, with obsolete transverse lines; (6) ab. *ochrea*, ditto, with distinct transverse lines; (7) ab. *obsoleta-rufa*, bright red, with obsolete transverse lines; (8) ab. *rufa*, ditto, with distinct transverse lines; (9) ab. *grisea*, dark grey, with darker transverse lines; (10) ab. *nigra*, black, with pale transverse lines.

He also dealt with ab. *badiofasciata*, Teich. (1883) (*Brit. Noct.*, *Append.*, IV, 123). Warr.-Stz. said that the *obscura*, Auriv. (1887-8), was this form.

(ssp. ?) *exigua*, Btlr., *Trans. Ent. Soc. Lond.*, p. 182 (1881).

ORIG. DESCRIP.—“Colour of primaries nearly as in *M. acetosellae*; sandy testaceous, faintly washed with pink, and slightly sericeous; the two lines of the central belt dusky, the inner line oblique, with pale internal border, the outer line transverse from inner margin to upper radial, whence it runs obliquely at an obtuse angle inwards to costa, with pale external border; between these two lines is a somewhat diffuse dusky angular stripe, the angle of which runs into the lower part of the reniform spot; both discoidal spots ill-defined, but rather paler than the ground colour, external border greyish, limited internally by a rather pale bracket-shaped line; a marginal series of black dots; fringe dark grey with pink reflections, and with a bright clay-coloured basal line; secondaries greyish-brown, sericeous, with bronzy reflections; external border rather broadly grey; fringe ochreous traversed by a grey line; under surface whitish. Wings crossed by a dull grey discal line.” Tokei, Japan.

Warr.-Seitz, *Pal. Noct.*, III, 231 (1911), said: “Forewing greyish-rufous, dusted with darker; lines as in *trapezina*; hindwing dark fuscous with a rufous fringe; the costal area in the ♀ yellower.” Amur-land, Japan. Apparently a stable form.

Treated as a good species by both Hampson and Warren (Seitz).

ab. *badiofasciata*, Teich., *Stett. e. Zeit.*, 173 (1883).

ORIG. DESCRIP.—“This form has the ground colour of the usual *trapezina*, only the male is paler and the female more reddish-yellow. The marking is often that of the type form, but the disc is dark chestnut-brown, and in addition the black dots are not apparent; also the waved line towards the margin is tolerably strongly dark shaded. The forewings below are darker than in the typical form; but the hindwings have instead of the punctured curved streaks, a wide black-grey band, and between the base and the middle spots on the costa is also found the beginning of a similar band which is very obsolescent.”

race *obscura*, Auriv., *Nord. Fjar.*, 161 (1887-8).

ORIG. DESCRIP.—“Forewing dark, reddish; centre of the wing wholly and uniformly black-brown—black without marking.” Sweden.

var. *saturata*, Stdgr., *Mem. Rom.*, VI, 504 (1892).

ORIG. DESCRIP.—“The Amur examples of this very variable species, mostly have brown, rarely brown-grey, forewings; the light yellow-grey specimens, so common in Europe, seem never to occur. The hindwings are always dark, such as only seldom occurs in European examples.”

ab. *conspersa*, Warr.-Stz., *Pal. Noct.*, III, 231 (1911).

FIG.—*l.c.*, plt. 47 g.

ORIG. DESCRIP.—“Pale ochreous, yellow-ochreous and reddish forms with a maximum of dark dusting.” Transylvania.

ab. *carnea*, Warr.-Stz., *Pal. Noct.*, III, 230 (1911).

FIG.—*l.c.*, plt. 47 f.

ORIG. DESCRIP.—“Pale with all the shadings, especially the thick median shade, delicate flesh colour.”

Drdt.-Stz., *Pal. Noct. Supp.*, III, 189 (1935), said that *rubella*, Krul. (1893), was “a fleshy-red form which is probably identical with the *carnea*, Warr.-Stz., and will have priority.”

ab. *lutescens*, Wrli. Drdt.-Stz., *l.c.*, 189 (1935), said: “has glossy yellow, not blackish, hindwings with normal coloration of forewings.”

Hoffm. & Klos., *Schm. Stier.*, III, 142 (1915).

ORIG. DESCRIP.—“A wholly light yellow example from Krieglach.” This is probably Tutt's ab. *obsoleta-ochrea*.

Hamp., *Cat. Lep. Ph.*, IX, 198 (1910), gave five aberrations, gave no name to four of them. He recognized *badiofasciata*, Teich. (1) “Forewing with the ground colour bright rufous.” This is probably the *rufa*, Tutt. (2) Forewing pale yellow slightly tinged with rufous, especially on medial area. (3) Forewing ochreous-white, slightly suffused with brown, especially on medial area. (4) Forewing ochreous-white, irrorated but not suffused with brown.

Calymnia, Hb. (1823), Barr., *Stdgr.*, *Splr.*, South, Hamp., Culot, Drdt.-Stz. [*Caradrina*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Cosmia*, Ochs. & Tr. (1816-25), Dup., H.-S., Gn.: *Ipimorpha*, Hb. (1821), Warr.-Stz.] *pyralina*, Schiff. (1775).

Tutt gave *pyralina*, View. (1789), but recent authorities have accepted the *Verz.*, Schiff., as the valid prior name.

Schiff., *Verz.*, 88, T. 12, “The upper wings red-brown. No. 12. Dark brown, bluish tinged.” Illiger, *Verz. (neu.)*, I, 317, identified the *cor(r)usca*, Esp., with *pyralina*, Bork.

Tutt, *Brit. Noct.*, III, 20 (1892): Meyr., *Hand.*, 117 (1895): Barr., *Lep. Brit. Is.*, V, 319, plt. 224, 2 (1899): *Stdgr.*, *Cat.*, IIIed., 205 (1901): *Splr.*, *Schm. Eur.*, I, 244, plt. 45, f. 22 (1906): South, *M.Br.I.*, II, 2, plt. 2, f. 3 (1908): Hamp., *Lep. Phal.*, IX, 191 (1910): Warr.-Stz., *Pal. Noct.*, III, 230, plt. 47 e (1911): Culot, *N. et G.*, I (2), 70, plt. 51, 8-9 (1914): Meyr., *Rev. Hand.*, 70 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 189 (1934).

Esp., *Schm. Abbild. Noct.*, IV (1), 424, plt. 135, f. 4-5 (1788-?). Tutt, in his description of Esper's figure of *corusca*, hardly gave the true impression of the species nor even of the figure. With Esper's figure before me, and a short series of this beautiful form, I must say that

the markings in the figure are far too bold and I should not call the transverse lines whitish. These latter are light purple (rosy whitish in another copy) in the figure, far too much so to represent the lines on the forewings. Tutt stated that the basal transverse line had its inner margin black. The figure has no basal line and the succeeding line has its external margin black, and only the two external lines with black margins internally. There is nothing soft about the two figures, nor have I seen any specimen with the hindwing having two conspicuous median transverse lines as Esper gives.

Illiger, *Verz.* (1801), I, 317, T. 12, remarked that Bork. only knew of this species from the descriptions of View. & Lang, because it was rarely captured. [Schiff., *Verz.*, 87 (1775).]

Hb., *Samml. Noct.*, 203 (1800-3), gave a very good figure.

Dup., *Hist. Nat.*, VII (1), 122, plt. 108, 6 (1827), gave a good figure.

Freyer, *Neu. Beitr.*, II, 57, plt. 129 (1836), gave an excellent figure of *pyralina*, but the underside showed the markings, especially the discal wide line, much too emphasized.

H.-S., *Sys. Bearb. Noct.*, II, 224 (1849), said Hb. 203 was "too purple-red."

Gn., *Hist. Nat. Noct.*, VI, 10 (1852), included *corusca*, Esp.

Splr., *Schm. Eur.*, I, 244, plt. 45, f. 22 (1906), gave a figure somewhat too heavy.

South, *M.B.I.*, II, 2, plt. 2, 3 (1908), gave a good figure of our British average form.

Warr.-Stz., *Pal. Noct.*, III, 230, plt. 47 e (1911), gave two good figures. Typical *pyralina* and ab. *corusca*, Esp., a brighter coloured form.

Culot, *N. et G.*, I (2), 70, plt. 51, f. 8-9 (1914), gave two good figures: 8, ♂; 9, ♀.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 189 (1934), added six more recently described forms, and he added considerably to our knowledge of variation in this species. Ab. *obscura*, Hoffm. & Klos., is dark blackish-brown, the white stripes obsolete; ab. *fuliginosa*, Du Bois, is also a dusky form; ab. *cuprea*, Horm., is a brighter coppery-red; f. *arnoi*, Schwrd., with pale rose-brown forewings; f. *dannehlii*, Hartig. (= *roessleri*; Dnhl.), is a very large deep red form with closely approximated outer transverse lines and very wide, bold white costal spot (probably these last two forms are one and the same); f. *saturata-brunnea*, Strnd. (Hamp.), with browner forewings, is probably identical with *corusca*, Esp., as illustrated in the main volume of Seitz, plt. 47 e.

Barrett described the Variation as follows:—

A little variable in size and in depth of ground colour, which is sometimes a rather light purple-brown.

The Names and Forms to be considered:—

pyralina, Schiff. (1775), *Verz.*, 87, T. 12.

pyralina, View. (1789), *Tab. Verz.*, 87.

f. *corusca*, Esp. (1788-?), *Schm. Abb. Noct.*, IV (1), 424, plt. 135, 4-5.

ab. *cuprea*, Horm. (1894), *Ent. Nach.*, XX, 65.

ab. *saturata-brunnea*, Strnd. (1915), *Arch. Natg.*, LXXXI, A. 11, p. 164.

ab. *obscura*, Hoffm. & Klos. (1915), *Schmett. Stierm.*, III, 141.

f. *arnoi*, Schwrd. (1924), *Mitt. Münch. Ent. Gesel.*, XIV, 100.

- f. *dannehli*, Hrtig. (1924), *Ent. Rund.*, XLI, 46.
 f. *roessleri*, Dnhl. (1925-6), *Ent. Zeits.*, XXXIX, 184.
 f. *fuliginosa*, Bs.-Ray (1931), *Zt. wiss. Ins. Biol.*, XXVI, 39.
 ab. *traegeri*, Bs.-Ray (1931), *l.c.*
 ab. *nigrobrunnea*, Bs.-Ray (1931), *l.c.*

Tutt dealt with: (1) the darker form as described by Vieweg, and (2) with Esper's *corusca*, the bright reddish form.

ab. *cuprea*, Horm., *Ent. Nacht.*, XX, 65 (1894).

ORIG. DESCRIP.—“Near Czernowitz. I have taken three specimens (2 ♂ and 1 ♀), just like two specimens from Crasna, belonging to a wholly striking aberration, which may be designated as ab. *cuprea*.”

“These specimens are uniformly (♂ and ♀) very small (not more than 25 mm.) and by their remarkably clear ground colour and uniform marking differ from the typical form. The colour of the forewings (as well as of the head, collar and thorax) is not as usual dark cherry-brown, but very light coppery red (somewhat like the colour tone of the forewings of *Hydroecia micacea*) with peculiar, feeble metallic gloss. The black (in the typical form very intensive and sharply marked) apical spot is either wholly obsolescent dark brown, or completely wanting, just as there is no trace present of a whitish flush toward the costal margin. The area of the apical spots, especially that portion between these and the outer transverse line, in the fine edging of the transverse line towards the costa, show in the typical specimens a strong chalky-white or bluish-white powdering; but in *cuprea* it is not in evidence, and these parts up to the costa are filled in by the coppery-red ground colour. The transverse lines and the central shade are very distinct, uniform black-brown. In typical examples the central area between the two transverse lines is darker, often intensive, red-brown; in ab. *cuprea* it is not so; at the most there is a projection formed by the outer transverse line on the inner side (towards the discal area) filled in glossy coppery-red, but this colour is different from the dark red-brown of the ground of the typical form.”

The hindwings are somewhat paler than in normal forms.”

(ab. *saturata-brunnea*) Hamp., *Cat. Lep. Ph.*, IX, 191 (1910).

ORIG. DESCRIP.—“Head, thorax and forewing browner.” This was subsequently named by Strand.

ab. *saturata-brunnea*, Strand, *Arch. f. Naturg.* (1915), LXXXI, A. 11, p. 164.

ORIG. DESCRIP.—“Head, thorax and forewings show a browner tint than the typical form.”

ab. *obscura*, Hoffm. & Klos., *Schm. Stier.*, III, 141 (1915).

ORIG. DESCRIP.—“In Peggau. A very dark specimen of the female, ground black-brown, without white transverse lines.”

ab. *arnoi*, Schwrd., *Mitt. Münch. Ent. Ges.*, XIV, 100 (1924).

ORIG. DESCRIP.—“A red-brown ♀. A fine aberration with clear rosy-brown forewing obtained by Arno Wagner in Waidbrück, Dolomites.”

f. *dannehli*, Hartig., *Ent. Rund.*, XLI, 46 (1924).

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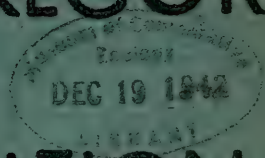
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Del. G. E. S. Brown.

"CONES" OF THE LARVA OF *CALOPTILIA PHASIANIPENNELLA*, HB.

CALOPTILIA (GRACILLARIA) PHASIANIPENNELLA, HB.

By T. BAINBRIGGE FLETCHER, F.R.E.S., F.L.S., F.Z.S.

(Plate V.)

The early stages of *Caloptilia* [= *Gracillaria*, Hw. = *Gracilaria*, Zeller] *phasianipennella*, Hübner, have been known under this specific name since 1806, when Hübner, under the name *Tinea phasianipennella*, published [tab. 495] Tin. vi, Alucitaform. B. a., figures 1 a-e, in his *Geschichte Europ. Schmett.* and, strictly speaking, this reference and date should be quoted as the original description of this insect, since the *Geschichte* figures [xi-xii 1806] antedated Hübner's figure of the adult, *Tinea phasianipennella*, published in 1810-1813 in his *Sammlung Europ. Schmett.*, Tin., t. 47, f. 321.

It is true that Réaumur (*Hist. Ins.*, ii, Mem. v, pp. 224-227, tab. 15, ff. 11-14) in 1736 had described the habits of a larva, apparently of this species, found on sorrel; but Réaumur's description, although very detailed, was pre-Linnean and without any nomenclatorial status.

In 1847 (*Linn. Ent.*, ii, 350-354, No. 16) Zeller dealt with this species and its life-history and redescribed the larva and its habits, giving the food-plant as *Polygonum hydropiper* and, according to von Tischer, *P. persicaria* also.

The above references are rather inaccessible to the average Microlepidopterist, who will, however, find a full account of this moth, its stages, biology and bibliography to that date in Stainton's *Nat. Hist.*, Tin. viii, 158-179, No. 12, t. 4, ff. 3 (1864). Stainton says:—"The larva feeds on the leaves of *Polygonum hydropiper*; also on *P. persicaria* and *Rumex acetosella* and *obtusifolius*; it commences by mining a narrow strip in the interior of the leaf, but at an early age it quits the interior of the leaf and commences feeding on the exterior in the following very peculiar way. All the other larvae of the genus, which form cones on leaves, do so by twisting the leaf without cutting it in any way, but the larva of *Gracilaria phasianipennella* bites a strip from the leaf, which is left only fastened at one end, and then rolled over and over and fastened together so as to form a sort of blunt conical habitation; in this cone the larva feeds on the under surface of the leaf, and when it has demolished the greater portion of the interior of its habitation it proceeds to a fresh leaf and constructs another roll. When the larva is full fed it spins a firm whitish cocoon in the interior of its last residence, and in a few weeks the perfect insect makes its appearance. There appears to be only one brood in the year, the larvae feeding in August and September, and the perfect insects appearing in September and October; these frequently hibernate, and are sometimes met with at the end of Spring or in early Summer." Stainton's figure (t. 4, f. 3 b) of "a sprig of *Polygonum hydropiper*, with a leaf cut and rolled up into two cases by the larva" does not show this habit as clearly as it might have done and in this respect Mr Brown's figures seem to be more characteristic.

Stainton, it will be noticed, drew attention to the (then) unique habit of the larva of *phasianipennella* in cutting a strip of the leaf along one margin in order to roll this strip into a cone. Precisely the same habit is found in the Indian species, *Caloptilia isograptæ*, Meyrick 1928, which feeds on *Polygonum glabrum*; its biology is described and figured in my

Life-histories of Indian Microlepidoptera, Second Series (*Ind. Agric. Sci. Monogr.*, No. 4, p. 61, t. 62 (1933): this species seems to be very closely allied to *phasianipennella*. The Indian *Caloptilia tetratypa*, Meyrick 1928, also has a larva which, when it emerges from its small, rounded blotch-mine at the edge of a leaf of *Sapium sebiferum*, cuts a strip off the leaf-margin and rolls it up to form a cone in which it lives; and this species also seems to be not distantly related to *phasianipennella* (see *l.c.*, p. 63, t. 63).

[Mr G. E. S. Brown, who made the illustration, found "the cones" near the river Stour at Kinson, Dorset, in July, and the moths emerged 4th August 1940. They were on *Polygonum hydropiper*, L.]

ON "AN ARTIST'S NOTE."

By P. SIVITER SMITH.

I am only just having the opportunity of catching up with the Entomological Journals. Being a Territorial, I heard war was declared when I was already in khaki; I have been back (*pro tem.* at least) in civil life for about a year and various upheavals in my life as a result of the war have prevented any interest in Entomology till now. I shall endeavour to catch up, but some of my notes will be about points raised during the last two or three years.

One of particular interest to me is "An Artist's Note," by D. M. (*Ent. Rec.*, liii, September 1941, p. 90), because my firm—V. Siviter Smith & Co. Ltd., Birmingham—is one of the largest reproductive and photographic houses in the country. I can give, therefore, fair views on the admittedly difficult situation outlined by D. M., because my firm work all colour reproductive processes—"ordinary" or letterpress blocks, litho or photo-litho plates, and colour photography, as well as drawing and ordinary photography—and I am an active entomologist and, therefore, can see it from that angle too.

It is a very big problem that has been raised and I can only touch the fringe of it; much technical information would have to be imparted to make it a full explanation, but I must leave everything but simple essentials out and some of my statements must be accepted without the necessary but long technical reasons.

Before D. M. reads further, will he please obtain *The Entomologist*, lxx, 894, November 1937, and refer to Plate VI of *Catocala fraxini*. That three-colour plate was produced under my supervision—I selected and arranged the specimens in a way that would avoid shadows—and I passed the negatives and each plate of the three (yellow, red and blue) colours as they were made. I believe that plate is the finest colour reproduction of Lepidoptera yet produced, although I am not the one who should say it. Every detail, the scaling, hairs, fringes, texture of the bluish band and so on is exceedingly clear and the colour match I can promise is exact. Note the even illumination, the absence of the pin-heads (deleted on the plates), the lack of shadows, the complete detail, the "roundness" of thorax, etc. I hope then that D. M. will think that modern methods can succeed.

All the same, D. M.'s remarks are largely correct. Present entomological reproductions are not good. Very briefly, the reason is this: Present methods are satisfactory but they are badly applied or unsuitable processes are used when better alternatives could have been used. The perfection of a reproduction of an object depends on the perfection of *all* the following items in turn:—The original sketch or photograph; the block or litho plate made from it; the paper it is printed on; the ink it is printed with. Any one of those stages, being unsuitable or inferior, will ruin the whole result.

Reproductions of work such as Horace Knight's were fine; they were chromo or "hand-drawn" litho plates on stone. Knight's drawings were copied by a litho artist in the required number of colours to print a copy of the original, perhaps eight or ten colours. These litho artists were skilled and are now largely replaced by men who work a similar process but by photographic methods—"photo-litho." This process is quicker and requires less colours to give a similar result, but the fineness of the detail is not obtained. But it could be obtained, but the correct type of sketch, method of reproduction and paper must be selected, and it seldom is these days because it is not left to experts to select the best methods.

The illustrations in Seitz are by the same chromo-litho process but are not on the whole good as *colour* reproductions because sufficient funds were not available to allow each plate to be proofed in colour and corrected if required before printing the main issue. Largely speaking, it is a matter of cost. The fine work *can* be done but it is expensive. Actually, it always was expensive, but in the old days there seemed more entomologists with the money to spend on good reproductions, while at the moment most people have to watch expense—I mean over the last twenty or thirty years.

Colour photographic processes, *properly applied*, do give better results in most cases, but costs are high. More of that point later. The danger, from a scientific point of view, of chromo-lithography is that the printed sheet is the work of an artist, or perhaps two or three, and its *strict* accuracy cannot be guaranteed; if a photo-process is used, the degree of accuracy (though not infallible in colour tones) is far higher, as you are physically recording an exact image of the actual original; it is not an artist's copy.

The new processes of colour photography, though technically good, are very difficult to work, are not yet perfected and are extremely expensive. The war has stopped experiments, but until it started we had gone a long way on the way to success. It will be many years yet, however, before it is a real proposition.

Black and white illustrations are quite simple and reasonably cheap to produce. Bad examples are usually due to bad original photographs and cheap paper. Reproductions are made by copper blocks with the image etched in the form of a screen or "grid" of cross-lines. On good paper this screen can be as fine as 175 lines to the inch, but cheap rough paper causes us to use screens of 120 lines to the inch and this spoils the sharpness of the picture. If the paper is good, there is no reason why—if the job is *started* properly—perfect results cannot be obtained. The difficulty is to get people to consult *before* they start the job; they send us a bad photograph and expect a good block, which is

impossible. A little advice would get a good photograph to commence with and the rest can follow and costs no more! And photography, drawing and reproducing entomological specimens has special problems of its own which must be met and which ordinary commercial experience does not meet.

Old reproductions were done by firms who understood such work. There are few such now; indeed, I suppose ours is probably the only one with an entomologist in it. But all the fine delicate work *can* be done, fine colour work can be done, excellent black and white work can be done, but not if it is not planned properly and followed through its processes by someone with the scientific angle on the results required. This work undoubtedly is but rarely seen now and I will try and give the reasons why I think this has happened.

Firstly, costs of reproduction, even using modern methods, have not fallen. The materials used in making a block are photographic plates, sensitive solutions, copper, special hard oak wood, coated chromo paper—and craftsmen's skill. It is a "hand" process and little machinery can be used. All materials are, therefore, expensive, and wages are high because of the skill required. There is a five years' apprenticeship and before the war no fully-trained man could be employed at less than £4 12s 6d a week, while one of our foremen drew £10 a week irrespective of overtime. No wonder costs are high! The wages to turnover averages 47%—exceedingly high by usual standards.

Secondly, there are fewer entomologists than there used to be; the market is smaller and, therefore, books have a smaller circulation, and that sends costs up. A set of three-colour plates, costing £15 say, will print up to 100,000 impressions. If only 1000 copies are sold, the cost per copy of the book containing such a plate is, pro rata, very much higher and the full benefit of the plates is not felt, as it would be if it were a commercial catalogue, for instance, where fullest use can be made of a large market.

The old chromo-litho work was cheaper because competition was not so fierce. There were plenty of litho artists and the work was not required in a hurry. A man or boy could at leisure work on a plate, dropping it to take on an urgent order and then picking it up later, and, withal, not requiring such high wages. Chromo-litho has almost disappeared, except for pottery decoration, and good artists are now scarce as the young men go in for the photo-processes. Seitz plates were probably produced by half-trained apprentices under supervision, which is most economical and good training for the lads.

I hope I am making my points reasonably clear without being too long about it, but it is difficult to condense!

As to how this problem is to be overcome is a more difficult matter, because cost is largely the item involved. The only satisfactory way that I can see is by a large degree of co-operation by Societies in the main, by individuals, and by some firm who is willing to make arrangements to meet special needs. If the Journals, Societies, and Museums formed some form of central fund by regular contribution, this fund administered by a committee in close consultation with the firm doing the work, I see no reason why economical production should not be achieved. A firm requires *steady* production. They want some work always on hand that can be slowly but regularly produced and steadily

paid for. That enables them to plan for their overheads, it enables them to arrange their labour economically, and gives them a future on which to base calculations. Then extra jobs can easily be sandwiched in without heavy costs caused by slack periods, etc. Some work such as Seitz issued, going through slowly and issued in parts, is ideal, and by carefully planning such a scheme with a firm the cost per figure could, I am certain, be very substantially reduced with benefit to all. But the difficulty would be to get the degree of co-operation to ensure funds and then to allocate them. Several blocks made together are vastly cheaper than having them all made independently, and at the moment individuals ordering their own blocks cannot easily combine with others to obtain this advantage. A central ordering bureau could obtain this advantage.

I hope I may have done something to enlighten D. M. To answer fully I should have to quote technical explanations at length, touch on commercial costing problems, expound Trade Union restrictions, and find a way to weld into one the separate orderings of illustrations by all individuals and Societies! Nevertheless, I see no reason why this should not be done; it ought to be done, as much valuable material is being missed because of the present situation.

CONCLUSIONS.

1. Modern methods can reproduce perfectly in colour or line if properly applied.
2. Economy can be effected by pooling requirements.
3. Colour photography is out of the question for some years yet.
4. Chromo-lithography is out of the question; no satisfactory artists are now available; its place is taken by photo-lithography.
5. Photo-processes avoid the danger of inaccuracy on account of artists having to copy an object or sketch.
6. Special arrangements to give a firm (or firms) steady production must be made by the "order-pooling" authority to enable them to economise.

AN ITEM IN MODERN "ANCIENT HISTORY" OF OUR LIST OF BRITISH BUTTERFLIES.

By Hx. J. T.

Recently, under unwelcome compulsion, I have had to move a considerable number of items of my large and comprehensive entomological library which had been comfortably stored away as being infrequently, if at all, subjects of consultation. In placing these afresh (an onerous and long task still only partly done) I have been looking into each item, whether small or large, and have recalled to mind many facts which length of time had driven from mind. Among the "olla podrida" of informative matters was a copy of the epoch-making Supplement by Edward Newman to the monthly paper *Young England*, in 1860, entitled "A Natural History of all the British Butterflies." This supplement was illustrated with beautiful wood engraved figures of all the 64 species recognized as undoubtedly indigenous. Added is a portrait of the author. There are 24 quarto pages and one of the chapters deals

with the reputed British species of Butterflies to the number of 76 and Newman, in no restrained language, deals with those who had been responsible for their introduction, and they were not dealers whom we modern entomologists are so prone to blame. The following is a quotation of some of his remarks:—

“ In this wildest and most extravagant romance, there is nothing half so wild, or half so extravagant, as in the histories of our British Butterflies. I do not allude to the fancies of schoolboys, whose inexperience may often lead them into accidental mistakes, and whose anxiety to possess rarities may induce them to over-rate the value of their captures; my observations apply only to the aged and the honoured; to a pious and amiable lady, to learned and respected men. I cannot forget the rapture with which, in 1827, I first opened Letitia Jermy's ‘ Butterfly Collectors’ Vade-mecum.’ I was in dreamland for months, and my dreams were of butterflies with strange names, butterflies which I painted in imagination with the gorgeous colours of tropical humming-birds. By degrees I became acquainted with the works of Adrian Hardy Haworth, James Francis Stephens, John Curtis, and John Obadiah Westwood—men whose hoary heads were encircled with scientific laurels, whose names never appeared in print without an appended alphabet of letters indicative of proficiency in knowledge and in wisdom, men whose brows were furrowed with thought, and encircled with a halo of science. Well, the combined efforts of these four gentlemen, and one lady, raised the number of our butterflies to one hundred and thirty-nine, and yet in 1860 I am unable to recognize more than sixty-four, sixty of them really obtainable by industry, and four, alas! to be lamented as things that have been and perhaps hoped for, as things that may be again.”

Newman's inclination was, when asked what had become of the butterflies omitted and why he had omitted them, to give the simple and straightforward answer, “ Because those reputed British butterflies are words, and not things, and because I wish you to acquire knowledge of things and not of words.” But on second thought he replied, “ Because five of our most distinguished entomological savants have placed them on record, I think courtesy demands I should not dismiss their lucubrations in quite so summary a manner.” After this Newman gives a series of short paragraphs on each of the 76 “ candidates for naturalization.”

Here are the names of the “ rejected candidates ” as he calls them. I will give the scientific names and omit the English names he also gives.

SWALLOWTAILS.—*Papilio feistamelli*, *P. duponcheli*, and *P. podalirius*.

WHITES.—*Doritis apollo*, *D. mnemosyne*, *Pieris chariclea* (spring brood of brassicae), *P. nelo* var. of *P. rapae*?, *P. metra*, *P. sabellicae* (*P. rapi*, f), and *P. monuste*.

RED-HORNS.—*Colias philodice*, *C. europome*, *C. palaeno*, *C. chrysotheme*, *C. helice*, and *Papilio myrmidone*.

FRITILLARIES.—*Argynnis aphrodite*, *A. cybele*, *A. niobe*, *A. charlotta* (*A. aglaia* ♀?), *A. dia*, *Melitaea parthenie*, *M. maturna*, *M. tharos*, *M. eos* (var. of *M. athalia*), *M. dietynna*, *M. tessellata*, *M. pyronia* (*M. athalia*).

ANGLE-WINGS.—*Vanessa huntera*, *Junonia hamstadiensis*, *Limenitis camilla*.

NYMPHS.—*Nymphalis populi* and *Araschnia levana*.

SATYRS.—*Satyrus maera*, *S. pilosellae*, *S. briseis*, *S. phaedra*, *S. maturna*, *S. jurtina* (♀ of *janira*), *S. hermione*, *Erebia melampus*, *E. mnestra*, *E. ligea*, *E. alcyone*, *Chortobius hero*, *C. arcanius*, *C. polymeda*, *C. typhon*, *C. polydama*, and *C. iphis* (dávus).

ARGUS-BUTTERFLIES.—*Thecla titus*, *T. spini*, *T. ilicis*, *Polyommatus virgaureae*, *P. dispar*, *P. chryseis*, *Lycaena boetica*, *L. labienus*, *L. thestylis*, *L. culaethis*, *L. lacon*, *L. artaxerxes* (v. of *agestis*), *L. dorylas*, *L. icarius*, *L. eros*, *L. argus*, *L. idas*, *L. hyacinthus*, *L. alcon*, *L. salmacis*, and *L. agrestis*.

SKIPPERS.—*Syrichthus oileus*, *S. malvarum*, *S. lavaterae*, *Hesperia sylvius*, and *H. vitellius*.

NOTES FROM IRELAND.

INTRODUCED IRISH LEPIDOPTERA.—There is a number of species of Lepidoptera occurring in Ireland which feed on plants which are not natives in that country. Pine was distributed throughout the British Isles during the early postglacial, but later died out completely in Ireland, and in Great Britain is now native only in the Highlands of Scotland and a few scattered localities in southern England. It is apparent, therefore, that such Pine-feeding species as *Panolis flammea* (*piniperda*), *Thera firmata*, *T. obeliscata*, *Ellopija fasciaria*, *Semiothisa liturata*, *Eupithecia pini*, *E. indigata*, and *Bupalus piniaria*, as well as *Evetria buoliana* and other Pine-feeding Microlepidoptera, all of which are apparently generally distributed in Ireland, must have been artificially introduced into that country. Many, or possibly all, of them may be natives in Great Britain but certainly owe their present general distribution to artificial means. Larch is not native either in Ireland or Great Britain, and therefore *Eupithecia lariciata*, *Argyresthia laevigatella* and other Larch-feeding species must have been artificially introduced into both countries. The distribution of the Spruce-feeding species, such as *Boarmiä* (*Cleora*) *ribeata* (*abietaria*), *Thera variata* and *Eupithecia tantillaria*, would appear to be natural.

During the early postglacial there were land-connections between Ireland and Great Britain and between Great Britain and the Continent but the British-Irish land-bridge was severed long before the land-bridge between Great Britain and the Continent, with the result that migrations of animals and plants into Great Britain continued to take place long after migrations into Ireland ceased. Beech, Lime, Sycamore and Hornbeam are all late postglacial arrivals in Britain and did not reach Ireland, so that Irish species which feed solely on these plants, *Cosymbia* (*Euphyia*) *linearia* and *Pammene regiana*, for example, must have been artificially introduced. R. E. Dillon recorded *Ptilophora plumigera*, *Tiliacea aurago* and *Mimas tiliae* from Ireland but Donovan (*Cat. Macrolep. Ireland*, 1936), quite rightly, doubts these records. The fact that the food-plants of these species are not natives of Ireland further goes to show that the records are probably incorrect.—BRYAN P. BEIRNE.

THE FOOD-PLANT OF *BLASTOBASIS LIGNEA*, WALS.—The life-history of this interesting species is described by W. Mansbridge and A. E. Wright in *The Entomologist*, 1939, p. 27, and the food-plants are stated to be Yew, Cotoneaster and Spruce. I have beaten the moth commonly from

Yew in the Glen of the Downs and elsewhere in Co. Wicklow and from Spruce at Ballyhooly, Co. Cork. At Tara Hill, Co. Wexford, it occurred commonly amongst Pine, there being no other conifer nearer than at least a quarter of a mile away, so that it would seem likely that Pine is also a food-plant. Several specimens occurred in a plantation of Larch at Kilruddery, Co. Wicklow, but there was Pine and Spruce within a few hundred yards. The above writers bred specimens from leaf-mould on one occasion, but previous and subsequent attempts to do this were a failure; in connection with this the following experience is of interest. During August and September 1941 I collected a large quantity of heads of *Juncus* for the purpose of rearing the rush-feeding species of *Eupista* (*Coleophora*) and their parasites. These were placed in a large, perfectly clean, glass vessel with some new blotting paper, and a sheet of glass was placed over the top and sealed with plasticine. It was only opened about four times during the winter, while the blotting paper was being dampened, for a few minutes each time. During August of this year (1942), besides a large number of specimens of *Eupista* and various parasitic Hymenoptera, no less than five adult *Blastobasis lignea* were found in the vessel. There was virtually no possibility of their having got in during the winter and they therefore must have been in the rush heads or stalks when they were collected during the previous autumn. The rush heads were collected from two localities, from the side of the mountain at the top of the Glencree Valley, Co. Wicklow, and from Calary Bog, behind the Glen of the Downs—in both cases nearly half-a-mile from the nearest conifers, or, for that matter, from the nearest trees of any sort. An examination of the rush heads produced four cocoons, composed of the rush heads and of *Eupista* larval cases, and in two cases they were attached to the blotting paper, showing that the *lignea* must have been introduced into the vessel as larvae. At the time of the year the rush heads were collected the larvae must have been very small, probably in the first or second instar, but the rushes had been too much eaten by the *Eupista* larvae to show whether the *lignea* larvae had been feeding on them also; there was, however, a quantity of frass which, from its size, probably belonged to the *lignea*. Mansbridge and Wright state that the pupae can live over two years before emergence takes place but this could not have happened here as the insects must have been in the larval stage when collected. It would be very interesting to see if such very unusual feeding habits will be confirmed by other collectors.—BRYAN P. BEIRNE.

THE LIFE-HISTORY OF AGONOPTERIX (DEPRESSARIA) COSTOSA, HAW.—During the past two years I have bred a large number of this species from the larvae. Meyrick (*Revised Handbook*, 1928, p. 683) describes the larva as being "grey; dorsal and subdorsal lines indistinctly darker; dots black; head and plate of 2 black," and gives the food-plants as *Ilex*, *Cytisus* and *Genista*. Clarke (*Proc. U.S. Nat. Mus.*, 1941, p. 113) gives *Laburnum* and *Quercus* (?) in addition. It is possible that Meyrick's "*Ilex*" is a misprint for "*Ulex*" as all the specimens I have bred were from larvae on Gorse.* The majority of the larvae were a dark chocolate colour, some being almost quite black and some dark green, answering to the description of the larva of *A. ulicetella*, Stt.

*In Meyrick's 1895 *Handb.*, p. 621, this was given correctly as *Ulex*; *Ilex* in the 1928 edition was evidently a *lapsus*, as suggested by Dr Beirne.—T. B. F.

(*umbellana*, Steph., auct.) or brownish-green. In Ireland, at any rate, it far prefers the Dwarf Gorse, *Ulex galii*, to the common *Ulex europaeus*. According to Tansley (*British Isles and their Vegetation*), *U. europaeus* is by far the commoner of these two plants and is essentially a lowland species, while *U. galii*, which is abundant in the west of Great Britain and in Ireland on non-limestone soils, typically occupies a higher zone, from 600 to 1300 feet. At places such as the top of the Glen of the Downs, Co. Wicklow (6-700 feet), where the two plants grow together, the preference of *A. costosa* for *galii* is particularly noticeable. On this plant the larva feeds firstly on the tip of a shoot, eventually eating into the stem and causing the death of the shoot-tip; these yellow dead shoot-tips are conspicuous against the green foliage. Later the larva forms a rough silken tunnel amongst the spines of a shoot, or, more usually, spins two adjacent shoots together and forms its tunnel between them. At the Glen of the Downs the clumps of *galii* were covered with the dead shoot-tips and the larvae were everywhere abundant, while on the clumps of *europaeus*, which are scattered about throughout the *galii*, only a few larvae could be found and most of these were feeding on the flowers rather than on the shoots. It would seem likely that the moth prefers *galii* because of its more tender foliage. Higher up on the hills, where *galii* is dominant, the larvae occurred abundantly, but lower down, where *galii* gives way to *europaeus*, the larvae were scarce and had to be searched for to be found. No larvae of *A. ulicetella*, Stt. (*umbellana*, Steph., auct.) were found, but this tends to be a local species in Ireland while *costosa* is common everywhere.—BRYAN P. BEIRNE.

COLLECTING NOTES.

NOTES ON VARIATION FROM THE WORTHING MUSEUM COLLECTION (*Con. from p. 120*).—*Maniola (Epinephele) jurtina*.—Common as it is, this is among the most interesting and variable of the Satyrids. There are series of English specimens from the Cotswolds, the N. and S. Downs, Witherslack, E. Durham, the New Forest and Bude. The Cotswold ♂s show a good deal of orange below the eye-spot, almost as much as the ♀s, but not so bright; one of them has a double eye-spot and another an indication of it. The N. Down specimens show great variety; they are mostly rather small, but some ♀s are rather large. Of the two upper-side ♂s one has orange below the eye-spot, the other has not; the former has a double eye-spot but only one pupil. In both ♀s the orange blotch of the forewing is suffused towards the base. All the other specimens are set for underside, where the variety is almost startling in the hind-wing. One ♂ has two very light shades and two conspicuous spots and a third hardly visible below the lower one; another ♂ has two very dark shades in which the spots are hardly visible; one ♀ has two rather light shades and no spots, another has two very dark shades; another with two very contrasted shades of brown, the lighter with a slightly violet tinge; another with two yellow-brown shades with only the lower spot visible; another with two dark brown shades, the lighter with a purple tinge. There are only a few specimens from the S. Downs, but

one of them is a beautiful ♀ with a very pale blotch, almost white around the eye-spot. The New Forest ♂s show very little orange on the upperside, but one has rather more than the others; one ♀ shows more distinct spots than usual in the ♀s, and bipupilled eye-spots on the underside forewings. Bude ♂s are rather small and have little orange on the upperside; the ♀s are large with orange suffused towards the base. All the undersides are rather dark with well-defined eye-spots on the hindwings; in two cases there are three spots, but differently placed, the third in one being below and in the other above the ordinary lower spot; another ♀ has two spots only but the second is above the usual top one, the lower being absent. The Durham specimens are all dark, with scarcely a trace of orange in the ♂s and much less than usual in the ♀s; one of the latter has a tinge of purple in the lighter shade of the underside hindwing. There is a fairly long series from Witherslack, all the uppersides dark with very little orange; one ♀ has the orange blotch divided in three and with tiny double eye-spots almost separated; a ♂ underside, with the two usual spots, has unusually little difference between the two shades of the hindwing; the ♀s have more varied shades of yellowish-brown, but have no spots; one has a white blotch in place of the orange on the forewing upperside.

From Brittany come rather large ♂s (though one is very small), and large ♀s with a good deal of orange suffusion on the forewing; the undersides are mostly dark, the ♂s with little difference between the two shades, the ♀s with a great deal; one shows a purplish shade, another a yellowish one; another has a distinct yellow edging to the dark base and the spotting is curious; one ♂ has a third above the upper one and another has indications of the same; another has a third spot below the lower one and indications of another above it and a fifth above the upper spot; one ♀ has the two usual ones and a third very small one above the upper one. Of two ♂s from Aix-les-Bains one shows a little dull orange on the upperside forewing, the other none; the ♀ has the orange suffused towards the base.

Of Italian specimens, two ♂s from Roccarso in the Abruzzi have unicolorous underside hindwings except for two orange-ringed spots, while of two ♀s from Siena the upperside shows much orange suffusion while the underside shows two much contrasted shades of yellowish-brown on the hindwing, without spots. There is a long series from the Lido, taken at the end of May. The ♂s are mostly unicolorous on the upperside, but one shows a conspicuous longish patch of orange below the eye-spot; another has a pale brown ground colour on which the androconial patch stands out very conspicuously. The ♀s are large with a good deal of suffusion; on the underside the ♂s have nearly unicolorous hindwings, one absolutely so except for a small white patch on one wing. In one case there are two conspicuous spots with indications of a third; of three underside ♀s one has the lighter band mauve, another yellow, and the third mauve with a yellow edging to the dark base, producing a beautiful effect which occurs again in the ♀ *hispulla* from La Granja whether the lighter band is yellowish or mauve.

Swiss ♂s from the Rhone Valley barely show any visible suffusion, but the ♀s a good deal, varying also in depth of colour, one being quite light; on the underside of the ♂s there is very little difference in the shade of the two colours of the hindwing, whether both are dark, or

both light; all the ♀s are of the *violacea* form; one ♂ is *semialba*. The light band in ♀s from the Jura is yellow in all cases; there is a curious ♀ from Caux in which this band is cut in two by a bar of the dark colour cutting across it. South of the Alps there is a very small ♂ from Reazzino with lightish hindwings upperside, and another with a very pale underside, the hindwing being nearly unicolorous; the ♀s are large, especially one from Mendrisio, the difference between the shades of the underside hindwing not being conspicuous. Belgian specimens are not remarkable except for the nearly unicolorous hindwings on the underside. There are two tiny ones from Jerusalem with deep orange suffusion, the eye-spot on the underside having a tiny black spot on its lower edge, while two ♀s from Haifa are rather large.

Specimens from the S. of France, Corsica, Spain, Greece, and Algiers are all of the *hispulla* form, the ♀s often showing a tendency in the eye-spots of the forewing to be prolonged downwards. A ♂ from Hyères has an extra spot on the underside hindwing below the lower one; a ♀ from La Granja has a tiny black spot below the upperside eye-spot, while a ♂ from Corte (Corsica) has a good sized black spot on the underside forewing below the eye-spot and a ♀ has two small ones in the same position. A ♀ from Digne has pale yellow on the upperside instead of orange. The race *telmessia* from Cyprus is really only a smaller form of *hispulla*, though the larger expanse of the orange on the forewings of the ♂s gives a slightly different facies. All *hispulla* ♂s have nearly unicolorous underside hindwings.—Rev. G. WHEELER, M.A., F.R.E.S.

NOTE ON MANIOLA JURTINA IN THE COTSWOLD AREA.—Mr Wheeler does not state the number of specimens on which he bases this generality, which certainly does not apply to the Stroud area of the Cotswolds as a racial character. Some Cotswold males have a slight trace (some in my collection "a good deal") of orange scaling but an equal number show no trace of this, and similar orange scaling is equally or more developed in some of my males from the South Coast (Eastbourne and Isle of Wight).—T. B. F.

SELENIA BILUNARIA AND BIRCH.—The protective resemblance of the majority of insects to their surroundings is common knowledge; either by colour, shape, position or a combination of all three, to their food-plant, etc., they elude detection by their enemies. A number of well-known examples will at once occur to the mind, which are not necessary to mention here.

All these instances can be called "passive" resemblance, since it is just the colour or outward form, in infinite variety, which protects them. What may be called "active" resemblance is quite a different thing and places the insect in a higher scale than the more common form. The larva of *S. bilunaria* seems to be an example of this, which may have been noted before though no record of it seems to have been made.

Not only does the larva resemble a hanging twig or catkin of the birch but it has the habit, when disturbed, of swaying gently from side to side, "trembling" it could perhaps be described as, in a similar manner to the more delicate part of this particular tree when moved by the wind. The "active" motion, which is a very striking one, gives a still closer resemblance, making it a living part of the tree itself,

so to speak. Has this been noted before and are other examples known?—D. P. MURRAY, Leicester.

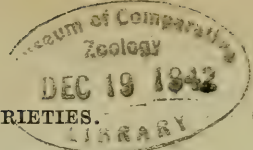
PLATYCHIRUS TARSALIS, SCHUM. [DIPT. SYRPHIDAE] IN SURREY.—On 11th May 1942 I captured a male of this species visiting the flowers of the Greater Stitchwort, *Stellaria holostea*, L., in an oak wood at Chelsham, Surrey. This is the fourth specimen I have taken in the county and in a third locality [vide *Ent. Record.*, li, p. 129, and liii, p. 133]. The date is earlier than the British records known to me.—L. PARMENTER (F.R.E.S.), 94 Fairlands Avenue, Thornton Heath, Surrey.

A NOTE ON INSECT VISION.—On 5th July 1942 I was noting the species of Diptera visiting the flowers of the Hogweed, *Heracleum spondylium*, L., near Devizes, Wilts. Among those present on one head of flowers was a female *Chrysogaster solstitialis*, Fln. A hovering male *Syritta pipiens*, L., slowly flew towards the flower-head. When but three inches away it made a sudden dart on to the back of the *Chrysogaster* and almost immediately flew off. The *Chrysogaster* remained. This appears to me to imply that the *Syritta* was able to recognise an insect at three inches or so but unable to identify the species at that distance.—L. PARMENTER (F.R.E.S.), 94 Fairlands Avenue, Thornton Heath, Surrey.

CURRENT NOTES.

THE Exhibition of Varieties arranged annually by the Council of the South London Entomological and N.H. Society took place on the afternoon of 10th October, in the Society's rooms in the Chapter House of Southwark Cathedral. As travelling especially was much restricted and so many members were on more pressing duties, a large attendance had not been anticipated, and much more material in normal times would probably have been brought. Mr S. G. Castle-Russell has again kindly offered to prepare the Report of the meeting and would be pleased to receive records not only from members of the Society but from others who were unable to be present on this occasion. It has been felt for some time that particulars of recent captures of interest and records of entomological work taken up during the season should be as complete as possible, and the advent of this annual arrangement affords an opportunity to all active entomologists not only to show others what has been done but to ascertain what others are doing. The report of the 1940 exhibition covered 8 pages in our magazine and that of 1941 took up 12 pages.

WITH regard to the recent article in the *Ent. Record*, liv, 9, naming the dark variety of *Procus literosa* ab. *obscura*, I wish to point out that this variety was named by me ab. *aethalodes* and the type specimen was taken by me at York on July 3, 1939 (vide *Entomologist*, lxxiii, 925, p. 136). Mr Wightman has kindly sent me his specimen for comparison and it is identical, except that mine is a ♂ and very slightly darker and his appears to be a ♀. I quite admit that his description is a better one than mine, but feel that my name should stand by priority and he has asked me to write to you as he had overlooked my record.—AUSTIN RICHARDSON, Beaudesert Park, Minchinhampton, Glos.



ORIG. DESCRIP.—“ Marking and size as in the typical form. Forewing upperside light carmine-red to clear coppery-red, often to brick-red. The outer margin and the inner half with strong metallic shimmer. The light costal streak violet shaded, the white edging of the outer line wanting. The inner-line of the outer marginal band of the forewing not or only scarcely irregular. Hindwing yellow-grey strongly, well suffused with golden-yellow. Cilia wider and brighter than in the typical form.” S. Tyrol form.

“ It differs from f. *cuprea*, Horm., the local race from Bukowina and Siebenburgen by size (length of forewing of *cuprea* only 14 mm.) and the whitish apical marking of the forewing.”

f. *roessleri*, Dnhl., *Ent. Zeits.*, XXXIX, 184 (1925-6).

ORIG. DESCRIP.—“ A form very considerably exceeding the clear wine-red typical form in size, and in which the markings, running nearer to one another, rarely appear any darker. All the markings weaker, giving a smoother lightened tone of ground. Hindwing broad bordered, central band quite apparent on the pale toned ground; all suffused with a stronger golden shimmer.” S. Tyrol.

ab. *fuliginosa*, Bs.-Ray, *Zts. wiss. Ins. Biol.*, XXVI, 39 (1931).

“ Traeger caught specimens of *C. pyralina*, which were quite divergent from the recognized form. The ground colour assumed a completely coppery-red, or brown tone. It very much resembled russet-grey. The marking remained. Since this form appears so divergent, I indicate it by the name ab. *fuliginosa*.” Near Konigsberg, 30.viii.28 and 14.viii.29.

ab. *traegeri*, Bs.-Ray, *l.c.*

ORIG. DESCRIP.—“ This form is completely markingless, shining light grey. Thorax and body the same. The reniform is white. The typical scaling between the outer margin and the waved line only shows in oblique light.”

ab. *nigro-brunneata*, Bs.-Ray, *l.c.*

ORIG. DESCRIP.—“ Wholly black-brown with yellow stigmata.”

Eremobia, Steph. (1829), Barr., South, Warr., Drdt. [*Hadena*, Schrank (1802), Meyr., Stdgr., Culot, Meyr.: *Ilarus* (Bdv.), Gn., (1829) (1838), Gn., Dup.] *ochroleuca*, Schiff. (1775).

Tutt did not go back to Schiff. Apparently he did not consult either Bork. or Treit., both of which authors refer to the *Verz.* (Both these works were in his library; they lie on my table now.)

Schiff., *Verz.*, 87, T. 4 (1775), described this species, “ The brownish-yellow, white marked Noctua.” *Ochroleuca*.

Tutt, *Brit. Noct.*, III, 24 (1892): Meyr., *Handb.*, 134 (1895): Barr., *Lep. Br. Is.*, V, 28, plt. 188, 2 (1899): Stdgr., *Cat.*, IIIed., 172 (1901): Splr., *Schm. Eur.*, I, 190, plt. 40, 4 (1905): Hamp., *Lep. Phal.*, VII, 409, fig. 67 (1906): South, *M.B.I.*, I, 263, plt. 126, 3-4 (1907): Warr.-Stz., *Pal. Noct.*, III, 175, plt. 41 b (1911): Culot, *N. et G.*, I (1), 152,

plt. 27, 11 (1912): Meyr., *Rev. H.*, 86 (1928): Drdt.-Stz., *Pal. Noct. Sup.*, III, 259, plt. 26 f (1937).

Ernst & Engram., *Pap. d'Eur.*, VII, 114, f. 488, had this species and the next (*irregularis*) sent to them as ♂ and ♀ of the same species, but noted that their characters were so different as to give "absolutely" no support to this information. They subsequently obtained ♀s of the former 488 a, b and ♂ of the latter 488 c, d.

Illiger, *Verz.*, 312 (1801), notes that Fab., *Ent. Sys.*, III (2), 85, called this species *flammea*, since in the Schiff. collection these species were placed close together.

Esp., *Abbild.*, IV, *Noct.*, II (1), p. 373, plt. 126, 1 and 4 (1788+?), gave two fairly recognizable figures. Tutt's comment was "quite unrecognizable."

Hb., *Samml. Noct.*, 92 (1880-3), gave a form unusual in the arrangement of forewing marking, and with a very dark marginal band on the hindwing. This he named *flammea* on the plate, but in the text *ochroleuca*.

Dup., *Hist. Nat.*, VI, 311, plt. 92, 3 (1836), gave a good average figure (the colour in my copy has deteriorated: a rare occurrence in the *Hist. Nat.*).

Frr., *Neu. Beitr.*, VII, plt. 657 (1851), gave a good figure.

Guen, *Hist. Nat.*, VI, 16 (1852), gave *citrina*, Don., as a synonym, and Ernst & Engram., 488 a, b, as a reference.

Splr., *Schm. Eur.*, I, 190, plt. 40, f. 4 (1905), gave a very fair figure; the markings are too definite and contrast too severely.

South, *M.B.I.*, I, 263, plt. 126, 3, 4 (1907), gave two very good figures.

Warr.-Stz., *Pal. Noct.*, III, 175 (1911), gave a good figure of a normal form of this very invariable species, plt. 41 b.

Culot, *N. et G.*, I (1), 152, plt. 27, f. 11 (1912), gave a very good figure.

Drdt.-Stz., *Pal. Noct. Supp.*, 259, plt. 26 f (1937), added and figured one newly described form.

Of the Variation Barrett said:

The colour differs a little in intensity and the female generally larger than the male.

The Names and Forms to be considered:

ochroleuca, Schiff. (1775), *Verz.*, 87, T. 4.

ochroleuca, Esp. (1788-?), *Abbild.*, IV (2), 373, plt. 126, 1 and 4.

f. *griseoleuca*, Dnhl. (1929), *Mitt. Münch.*, XIX, 108.

ssp. *asiatica*, Drdt. (1926), *Ent. Rund.*, LIII, 492.

Tutt dealt with the typical form only.

ab. *griseoleuca*, Dnhl., *Mitt. Münch.*, XIX, 108 (1929).

ORIG. DESCIP.—"All the yellow-brown tones are here dull brownish-grey, which also tones down the whitish to grey; the appearance is thus paler softer than in the typical form. The black-brown lines and curves in the discal area are wanting. The darkened portion of the outer-margin of the hindwing becomes grey with yellowish tinge." *Montagnana Grande*.

ssp. *asiatica*, Drdt., *Ent. Rund.*, LIII, 492 (1936).

ORIG. DESCRIP.—“Essentially smaller than the typical European race. The brown marking stands out sharply on the clear whitish ground, but more reduced, the marginal area being almost pure whitish; the fringes wholly without chequers or with only an indication of darker chequering. Hindwings purer white with blackish marginal band.” 26-28 mm. Sultan Dag.

Genus *Harmodia*, Hb. (1820).

Of this genus name Draudt-Stz., *Pal. Noct. Supp.*, III, 102 (1931), comments—“Whether one should retain the generic name that was given in 1827 to *compta* is a matter for individual decision. There would appear to be more justification than to take the name created for *filigramma* by Hübner (two pages previously), viz., *Polymixis*, Hb. For my part I should prefer to retain the almost universally known name *Dianthoecia*, Bdv. (1834), which seems to me the better name, also from a biological standpoint.” (1827 is in error.—Hy. J. T.)

This comment is quite good and reasonable in my opinion.—Hy. J. T.

Dianthoecia, Bdv. (1834), Gn., Barr., Stdgr., Splr., Sth., Culot [*Harmodia*, Hb. (1800), Meyr., Meyr.: *Epia*, Hb. (1821), Warr.-Stz., Hamp., Drdt.-Stz.] *irregularis*, Hufn. (1766).

Tutt, *Brit. Noct.*, III, 26 (1892): Barr., *Lep. Br. I.*, IV, 226, plt. 161, 3 (1897): Stdgr., *Cat.*, III ed., 164 (1901): Hamp., *Lep. Phal.*, V, 228, f. 39 (1905): Splr., *Schm. Eur.*, I, 180, plt. 37, 31 (1905): South, *Moths Br. Is.*, I, 251, plt. 125, 1 (1907): Warr.-Stz., *Pal. Noct.*, III, 82, plt. 21a (1909): Culot, *N. et G.*, I (1), 120, plt. 21, f. 8 (1911): Meyr., *Rev. Handb.*, 148 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 111, plt. 18a (1934).

Ernst & Engr., *Pap. d'Eur.*, VII, 114, fig. 488 c, d (1790), gave two figures which they could not locate, but which undoubtedly represent *irregularis* (*echii*). 488 a is much too definite in marking.

Bork., *Naturg.*, IV, 166 (1792), redescribed and named this species under the name *echii*, which he attributed to Brahm, although he acknowledged it to be the *irregularis*, Huf.

Bork., *Scriba's Beitr.*, III, 204, plt. 13, 5 (1793), contributed the first article describing this species under the name *echii*, with the accompanying plate with a figure of the species under the name *syngenesiae*. There were months of delay after the plate was made and it appeared after the *Naturg.* was published, hence the discrepancy.

Esper, *Abbild.*, IV (2), 2, p. 79, plt. 198, 5 (1799), described and figured a moth which he named *brecciaeformis*, which Werneb., *Beitr.*, II, 5 (1864), said was *irregularis*, Hufn. (*echii*, Tr.).

Hb., *Samml. Noct.*, f. 90 (1800-3), gave a good figure, but rather too yellow in coloration.

Hb., *Samml. Noct.*, 362 (1803-8). Not the *irregularis* (*Dianthoecia*). Tr., *Schmett.*, V (2), 343 (1825), redescribed it under the name *echii*, Bork., but does not recognize it as the *irregularis*, Hufn., as did Bork.

He gives *syngenesiae*, Bork., *Scriba's Beitr.*, III, 204, plt. 13, 5 (1793), and *brecciaeformis*, Esp., as synonyms. He recognized figs. 488 c, d, in *Pap. d'Eur.* as this species.

Frey., *Neu. Beitr.*, II, 127, plt. 173 (1831), gave a good figure. He said that Hb., fig. 90, was good, but that Esper's fig., plt. 198, was only recognizable.

Dup., *Cat. (Hist. Nat. Noct.)*, did not deal with this species. He doubted the existence of it in Europe; Boisduval said that all that he knew came from S. America.

H.-S., *Syst. Bearb.*, IV, 249 (1849), called it *echii*, Bork., said the fig. 90, Hb., was bad, and gave *syngenesiae*, Scrib., and *brecciaeformis*, Esp., as synonyms. He did not mention *irregularis*, Hufn.

Gn., *Noct.*, II, 18 (1852), gave *brecciaeformis* and *syngenesiae* as synonyms.

Evers., *Bull. Mosc.*, IV, 105 (1856), describes *aberrans* as a species and compared it with *echii*.

Oberthür, *Et.*, V, 77, plt. 7, f. 11 (18), described a form from W. China as *admiranda*. Warr.-Stz. put it as a synonym of *aberrans*, which he considered a separate species.

Tutt recorded the *aberrans*, Evers., from Stdgr., *Cat.*, IIed.

Meyr., *Handbk.*, 78 (1895), used the genus name *Harmodia*.

Barrett, *l.c.*, plt. 161, gave two figures, both too dark generally, there being only slight differences in shade.

Stdgr., *Cat.*, IIIed., 164 (1901), adopted *echii*, Bork., as a synonym and took the ab. *aberrans*, Everman, as a var. with the *admiranda*, Obthr., as its synonym, which last he redescribed "thorace unicolore subalbido, al. ant. basi [margineque exter.] subalbidis, in medio saturatius-fasciatis."

Splr., *Schm. Eur.*, I, 180, plt. 37, 31 (1905), gave a fairly good figure and dealt with one form, ab. *aberrans*.

Hamps., *Lep. Phal.*, V, 228, fig. 39 (1905), has a good b. and w. fig. Synonyms *echii*, *syngenesiae*, and *brecciaeformis*.

South, *M.B.I.*, I, 252, plt. 125, 1 (1907), gave a good figure.

Warr.-Stz., *Pal. Noct.*, III, 82 (1909), gave a fairly good figure, plt. 21 a, and gave no forms. They considered *brecciaeformis*, Esp., *echii*, Bork., and *syngenesiae*, Scriba, as only synonyms of the typical form. They said of *aberrans*, Ev., "apparently a good species." "Whiter ground and deeper brown suffusion."

Culot, *N. et G.*, I (1), 120, plt. 21, f. 8 (1911), gave a good figure of a normal form.

Meyr., *Rev. Hand.*, 148 (1928).

Drdt.-Stz., *Pal. Noct. Supp.*, III, 111, plt. 15 a (1931), gave a good figure to replace the unrecognizable typical figure in the main volume. One new form was reported.

Of the Variation Barrett said:

Only variable in the intensity of the rich brown markings and cloudings.

The Forms and Names to be considered are:

irregularis, Hufn. (1766), *Berl. Mag.*, III, 394.

echii, Bork. (1792), *Naturg.*, IV, 166. (Syn.).

syngenesiae, Bork. (1793), *Scriba's Beitr.*, III, 204, plt. 13, 5. (Syn.).

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(*Adopoea*) *ludoviciae*.—Dr H. G. Harris, 5 Archer's Road, Southampton.

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search purposes. Postages, etc., will be paid.—Dr Ewen Cameron, Imperial
Institute of Entomology at Clunebeg House, Drumadrochit, Inverness.

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from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon,
Somerset.

Wanted.—Barrett, *Lep. Brit. Isles*, Vol. iii; *Culot*, *Noctuae* and *Geometrae*.—A. J.
Wightman, "Aurago," Pulborough, Sx.

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DECEMBER 1942

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JAN 21 1943

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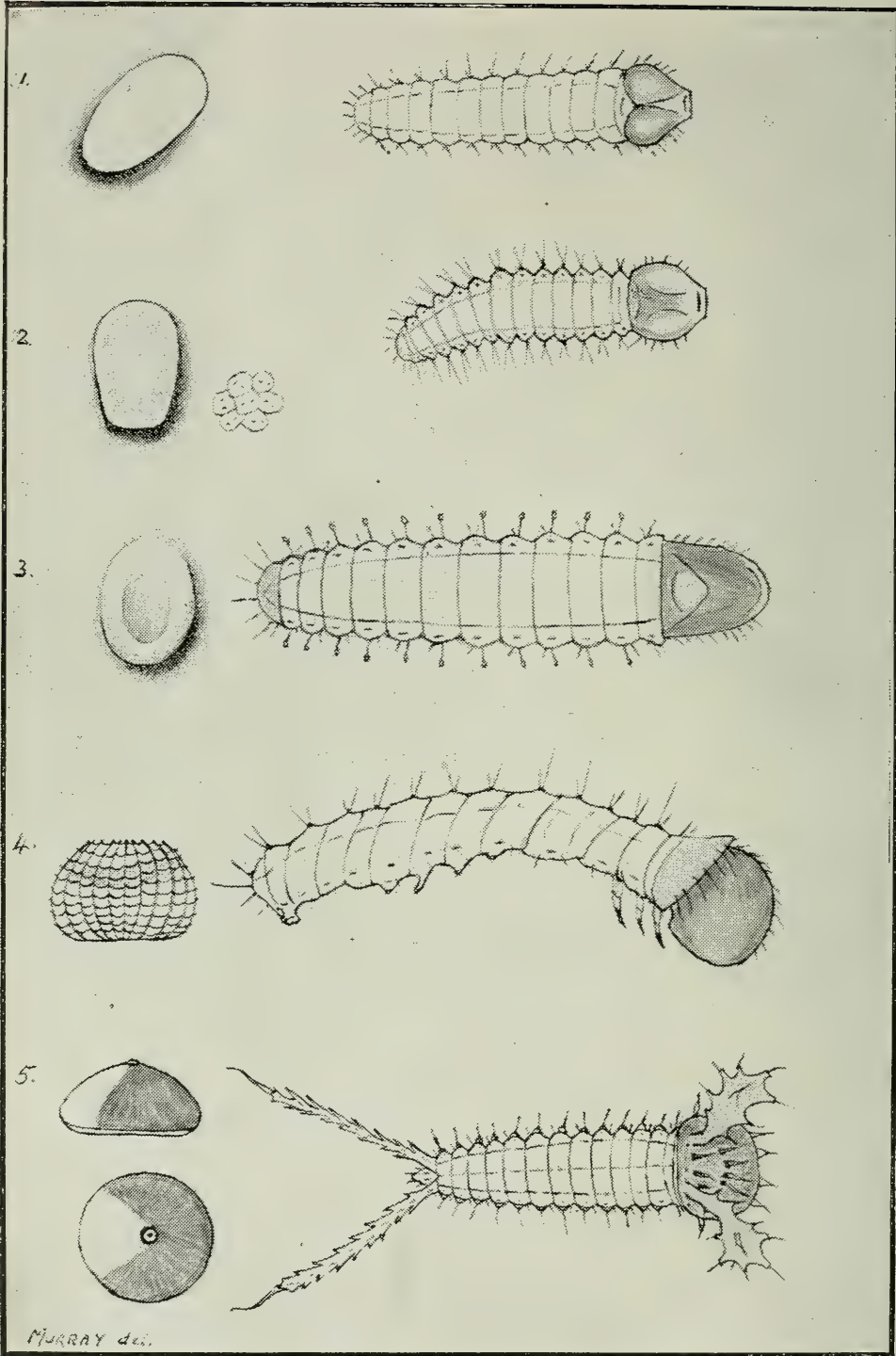
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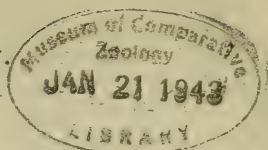
FIRST STAGE LARVAE.

FIRST STAGE LARVA.

By Rev. DESMOND MURRAY.

(Plate VI.)

13,820



It is true to say that the great majority of the larvae of our native moths, at full growth, are now known, this stage having been studied and figured by a number of workers. This is not true, however, of the early stages. In other words, although there is still a large field of study with reference to the full-grown larvae, the early stages are comparatively unknown. The egg and the first instar are often the most interesting stages, as well as being the most enlightening in the study of the phylogeny.

From all the books you may be able to consult you will find very little information about these stages. There is no work, for instance, on the ova, those beautiful little objects, so exquisite in their construction, so wonderful in their variety of form and colouring. The first stage larvae are even less known. The genitalia of all our moths have now been figured and this study has considerably helped to correct classification; some hold that it is essential, but the early stages yet remain to be figured and described.

A much closer study then is warranted of these stages, if a complete knowledge is to be gained of the insect's whole life. Correct drawings need to be made of the egg and first stage larva—they are often too small to photograph—until this great unknown field of work is exhausted. These studies will, no doubt, reveal many hitherto unsuspected facts.

With these points in view, a few notes have been put together on several examples, taken at random, without any particular order of families or species, examples that offered themselves from time to time. The comparison of even these few examples shows us, as I think all will admit, that there is a vast field of interesting and instructive work still at hand for those who have energy to pursue it.

(1) *Platyptilia gonodactyla*.—The egg is a tiny object laid singly on the underside of the leaf of the food-plant; dullish white at first, in colour, without any surface pattern, turning pale green later, then to yellow or bronze, before the larva emerges in ten to twenty days. The development seems to be a very slow one, moisture, as with all ova, being essential to development. The larva on emergence measures something over only $\frac{1}{2}$ mm. in length, white or yellowish in colour, with regular setae on the segments; head black and strongly formed. The head of all first stage larva is the most prominent feature, the centre, so to speak, of its whole life. The larva buries itself in the soft texture of the leaf and so reaches full growth. [In the case of *gonodactyla*, the subsequent method of feeding depends on the brood; eggs laid, viii-ix, give larvae which at first are leaf-miners, then burrow down into the stem and hibernate and in April feed on the flower-shoot and pupate inside the flower: from eggs laid in vi the larvae feed on the underside of the leaves, and pupate there.—T. B. F.]

(2) *Perizoma flavofasciata*.—The egg is distinctly yellow or orange in colour, with a delicate surface pattern, large for the size of the moth, laid singly on the flower calyx of the food-plant. The larva

emerges after nine or ten days, according to temperature (see *Ent. Record*, Vol. III, 1892, p. 173 and 255: "The Geomt. Duration of Ova State" (with tables)). On emergence it measures about 1 mm., yellowish in colour, protected by fine setae all over the body; head black. It burrows into the calyx of the flower, remaining within to full growth, protected as in a kind of tent.

(3) *Geometra papilionaria*.—The eggs are laid singly on the leaf of the food-plant, in colour whitish at first, changing to greenish-yellow and then to pink; the larva emerges in six or seven days. It then measures about 1 mm., and is a very different object from the better-known, full-grown larva; sooty-black in colour with a strongly-formed reddish-brown head, the segments being armed with blunt-headed setae. After feeding from July to October, the larva hibernates until the following Spring.

(4) *Polia chi*.—The eggs are laid generally in little clusters on the food-plant. They are beautiful objects, yellowish at first in colour, turning later to a crimson-brown, shot with darker markings. The egg is deeply ribbed and reticulated. Laid generally in September, they do not hatch until the following April. On emergence the larva measures about 1 mm.; dull whitish to green in colour, head brown. The larva selects a variety of food-plants. At this stage it is very active and especially interesting, for although the abdominal legs are present in a rudimentary form, they do not develop until the second or third instar, the front legs and hind claspers alone being used. This gives it the appearance of a "looper" caterpillar; it also rests like a Geometer, with extended body. This peculiar feature is to be found with other Noctuae larvae as *Aplecta advena* and several others. This peculiarity may have been noticed before, but no explanation seems to have been given for its being, to all appearances, a Geometer in the first two larval instars and a Noctua in the egg, pupa and imago.

(5) *Dicranura vinula*.—The eggs are laid either singly or two or three together on the leaf of the food-plant. They are button-shaped, a rich brown in colour (sometimes of a buff tint and these eggs produce a lighter-coloured larva). The egg is convex above with a small pit at the apex and a finely grained surface. It closely resembles a fungoid growth found on the leaves of sallow and other trees. The larva hatches out in three weeks or less, generally in May-June; measurement 2 mm. It is certainly a fearsome object, being armed with horns on the head, sharp spines over the body, and spinous tails from which protrude whips, to warn off parasitic flies and other enemies. The larva is at first black in colour, the horns and tails reddish-brown, the whips carmine. It passes through five stages to full growth, resting from four to five days each time; the colouring at each stage is distinct from the previous one. By degrees it loses its armour (except the long tails) and in the third stage assumes a much milder appearance and less aggressive attitude at full growth. In all its stages the protective resemblance to the black withered edges of the leaves is very striking. Dr Chapman many years ago noticed that at each ecdysis the larvae not only eat the cast-off skin but the portion of the leaf on which silk was spun; in some way this is, no doubt, good for the health of the larva. In spite of its armour this larva is very subject to attack by ichneumon flies and similar enemies. Seven different species are recorded by

Bignell. One species, *Paniscus testaceus*, lays its black eggs on the nearly full-grown larva, on the second segment, just above the thoracic legs. The larva completes its cocoon but does not reach maturity. At full growth *vinula* is a very well-known larva.

EXPLANATION OF PLATE.

Egg and Larva—First instar.

- (1) *Platyptilia gonodactyla*, $\times 50$.
 - (2) *Perizoma flavofasciata*, $\times 40$.
 - (3) *Geometra papilionaria*, $\times 25$.
 - (4) *Polia chi*, $\times 35$.
 - (5) *Dicranura vinula*, $\times 25$.
-

THE OCCURRENCE OF CUCULLIA SCROPHULARIAE IN BRITAIN.

By A. J. WIGHTMAN, F.R.E.S.

Under this heading Mr E. P. Wiltshire, in the October number of the *Entomologist's Record*, asserts that the French and Belgian entomologists take and distinguish this species in the larval stage.

So did we in England, where it was considered anything but scarce, until doubt was cast upon its existence as a species distinct from *verbasci* or *lychnitis*. Then after its champions had told us all they knew about it, it became obvious that the characters and statements upon which it was founded were entirely unconvincing.

The French and Belgian collectors think and assert that they get the species we all know. The German collectors and dealers also claim to get it in abundance and so they should. The original account of *scrophulariae* says it occurs near Vienna on *Verbascum* (Del. Scharst, Vol. VI, pp. 131, 133).

The collectors of these countries have known for upwards of 50 years that we wanted proof of what *scrophulariae* was, so why did not they enlighten us if they could?

From the first the species has been supported by statements which have been unsupported by any character which could be found, and it is impossible to disprove the existence of a species no one has attempted to prove exists. Hence the long run of doubt.

Now Mr E. P. Wiltshire comes forward and says that he knows there is such a species. Will he please give proof of his assertion?

There are a number of well-distinguished Cucullias in the group on the Continent, and it may well be that *scrophulariae* is the prior name for one of these (possibly *lychnitis*), which has enabled the fable, I believe, to linger there longer than here, where having only two species with which the supposed *scrophulariae* could be confused, a conclusion has been much easier.

The three species, if there be three, in this triangle: *verbasci*, *lychnitis*, *scrophulariae*, all occur in the same areas and eat the same food-plant, so absence of genital characters would surely be conclusive in this case.

So far we have not an iota of proof as to *scrophulariae* being a good species, but I trust Mr Wiltshire is able to enlighten us with some facts that can be proved.

The mere assertion that the larva is distinctive is of no value unless a description can be given of what the larva is like, and it can be demonstrated that this special type of larva is not merely a form of some other species.

Both *verbasci* and *lychnitis* have very variable larvae and one could erect several species in addition to *scrophulariae*, by producing especially aberrant forms, were it not for the fact, that experience has shown that differences in markings and in colour distribution in this group of larvae are not sufficient evidence to justify setting up fresh species on the characters of strange larvae alone.

COLLECTING NOTES.

TABANUS BOVINUS, L. (DIPT.) IN SOMERSET.—On 22.vi.42 Mr J. F. Bird brought me a pair of large Tabanids which he had just caught in his garden. The male is undoubtedly *T. bovinus*, L., as it has ommatidia of the same size all over the eye; the female differs distinctly from females of *T. verralli*, Old. (*T. sudeticus*, Zell. var. *perplexus*, Verr.), and agrees with Goffe's and Surcouf's descriptions of *T. bovinus*, L. Modern dipterists have come to the conclusion that many of the old records of *T. bovinus*, L., were based on specimens of *T. verralli*, Old., or *T. sudeticus*, Zell., and that *T. bovinus*, L., is rare outside some enclosures of the New Forest. No other specimen of this species and no specimen of the other two large Tabanids have been seen here by Mr Bird and myself.—H. AUDCENT, Selwood House, Clevedon, Somerset.

TWO DIFFERENT TACHINIDS BRED FROM THE SAME HOST.—Early in July 1942 Mr J. F. Bird brought me a cocoon of *Malacosoma neustria*, L., with a dipterous pupa which had been formed by a larva that had left the host (the usual procedure) and with another dipterous pupa inside the cocoon. From the former there emerged on 24.vii.42 a specimen of *Neopales pavida*, Mg., and on 26.vii.42 there emerged from the latter a specimen of *Carcelia gnava*, Mg., one of the few Tachinids that pupate in the host. For some years I have been reading all the literature I could find on parasitic Tachinids and I have never come across a record of two different Tachinids bred from the same host.—H. AUDCENT, Selwood House, Clevedon, Somerset.

RHINGIA ROSTRATA, L. (DIPTERA) IN N. KENT.—I had the good fortune to take four ♂♂ and three ♀♀ of this rare Syrphid in Joydens Woods, Bexley, Kent, on 5th and 12th September this year. I have collected in these woods for many years but this is the first time I have taken *R. rostrata*; the other common species of Rhingia—*R. campestris*, Mg.—occurs there regularly. My specimens were taken on flowers of Scabious and Mint. According to Mr R. L. Coe's paper in the *E.M.M.* on this species (Vol. 75, pp. 224-227, October 1939), it is still very little known in Britain.—H. W. ANDREWS.

THE DIPLOMATIC EARWIG.—One day a friend of mine in Istanbul rang me up to ask if it were true I "went in for earwigs."

"Of course it is," I replied, "Why do you ask?"

I heard a little gasp at the other end, and then my friend continued: "Jones, up in Ankara, said he had heard that you do, but could scarcely believe it. Anyhow, he's caught one for you, and wants to know what to do with it. He's keeping it in a little bottle and feeding it on vermouth. He hopes that's all right. What is he to do with it?"

"Send it down by the King's Messenger," I replied.

Time went by and the earwig never materialised. So next time I met my friend I asked him what news he had of the earwig.

"Oh, rather bad news, I'm afraid," he replied. "Jones thought it must be feeling a little cramped up in that bottle, so one day when he was dining in a restaurant he let it out to run about on the table, as he thought it wanted a bit of exercise, to keep fit. Unfortunately, it ran away too quickly for him to catch it."

"Did he lose it then?" I asked anxiously, for earwigs from Anatolia are rare in collections.

"Yes, it made straight for the man sitting at the next table and took refuge up his trouser. The man jumped up and started making a fuss and scratching, as though it were a poisonous creature. I'm afraid you'll never see that earwig. Do you know whose trouser it ran up?"

"No, of course not. Whose was it?"

"It was the German Ambassador's."—MALCOLM BURR, D.Sc.

A RARE FORM OF *TRIPHAENA PRONUBA*, L. AT STREETLY.—In August of this year I was fortunate enough to find in my garden at Streetly, on the north side of Birmingham, one of the rarest forms of *T. pronuba*, L. This is the variety with the dark discal lunule on the hindwings and it is known as var. *hoegei*, H.-S. The lunule is not, of course, as heavy as that found, for instance, in *Triphaena comes*, Hbn. (*orbona*, Fab.), but is nevertheless quite clearly discernible; it is more a thin curved line in the shape of a crescent rather than the usual widely shaded lunule of *T. comes*, Hbn., but its outline is the same.

As far as the insect as a whole is concerned (it is a female) it is of the form *grisea-brunnea*, Tutt. In this variety the ground colour is dark reddish-brown, with dark reniform, a dark quadrate spot between the stigmata that is continued inwards beyond the orbicular, and with dark marbling under the stigmata; the costa, orbicular, and transverse lines are grey.

The existence of the blackish discoidal mark on the hindwings is the point of main interest. It would appear to be an extremely rare occurrence.—P. SIVITER SMITH, Little Aston Park, Streetly, Staffs.

NOTES ON VARIATION FROM THE WORTHING MUSEUM.—The Rev. G. Wheeler's interesting series of notes which have been appearing raise the following points:—

P. rapae and *P. manni*.—I have a few *P. manni*, the spotting of which is, generally speaking, heavier than in *rapae*; the "squareness" of the wings of *manni* is more apparent in the hindwings than in the forewings, to my eye, at least, *rapae* being more pointed between the costa and outer margin; *manni* is, on the whole, whiter than *rapae*, though I have specimens of the latter as white as *manni*. Mr Wheeler

notes the extreme rareness of the forewing spots of *rapae* being concave towards the outer border; I have one example of *rapae* where this occurs. It certainly seems an unreliable point in *manni*.

There is one point of which I am reminded that needs careful attention when comparing closely allied species, and particularly with forms on which differences are founded in part on the shape of the wings. Sometimes the setting of such examples is not always in the same style and if such difference in setting exists it can, unless due allowance is made, alter the apparent shape of the wings a good deal.

For instance, my *P. manni* were sent to me by Mr B. C. S. Warren and were set on flat boards; my own *P. rapae* are set on the usual English rounded boards. Now such a difference in setting is alone sufficient to make the wings of *manni* appear squarer. In such cases the insects should be reset to conform in style for comparison or allowance must be carefully made, the former being preferable, of course, but consuming a deal of time.

E. cardamines.—Mr Wheeler says he has very rarely come across ♀ specimens with buff colour on the hindwing upperside, apart from the Irish form. I have four ♀♀ which show this very clearly and three others show it slightly. Three of the clearly suffused examples come from Pebworth, Worcestershire, but the best one is from Harlyn Bay, N. Cornwall. The buff colour extends in a wide band from the base to the outer margin and running down below the black discoidal spot which is also present in this example; the costa of the forewings is similarly buff coloured up to the apex.

Euphydryas (M.) aurinia.—I am interested in the note that the examples from Wolford (Warwickshire) are the largest of the English examples. I have searched many times for this species at Wolford but without success, and I fancy it is not now found there. Mr Wheeler refers to the Irish examples as of race *hibernica*. There is considerable doubt over the variety described as *hibernica* by Birchall. Kane is unsure of it and Col. C. Donovan says that he has never come across an example that exactly suited Birchall's description (*Cat. Macrolep. Ireland*, 1936, pp. 8-10). Evidently, on the part of Mr Greer at any rate, there has been some change of opinion in view of what Col. Donovan says, because Mr Greer figured in a coloured plate an example as var. *hibernica*, Birchall, in *The Entomologist*, January 1925 (Plate I). He compares it with a plate contributed by Kane to *The Entomologist*, 1901, who gave there figures in colour of *artemis*, Fabr., *praeclara*, Kane, *scotica*, Robson, all from Ireland, and he shows *hibernica* as having the central series of spots paler than in *praeclara*.

Mr Greer's figure (*Ent.*, 1925) does not match the description of *hibernica* given by Col. Donovan, who states it is "an extreme form of *scotica*, Robson, but with whitish or pale straw-coloured spots; the spots in the discal area coalesced, like a half-open fan, forming a blotch, *litura* as Birchall calls it in his Latin description, and the black terminal band of the hindwings with very narrow, almost imperceptible, straw-coloured lunules." Mr Greer's figure does not show the coalesced spots nor are the straw-coloured lunules anything but distinct. Perhaps the series in the Worthing Museum may possess an actual *hibernica* as required by Birchall's original description.—P. SIVITER SMITH.

HEODES PHLAEAS, L., ABUNDANT.—The severe winter again seems to have suited some of our butterflies, notably *H. phlaeas*, which has been most abundant in two broods this summer. I obtained ova from a ♀ of the first brood and reared about twenty fine examples of very deep rich red coppery colour; only one variety, a male with the right forewing dusky yellowish.

I have about thirty-five larvae feeding up now from two females of the second brood (end of August to middle of September); I am keeping them in a sunny window. Were they out of doors in a wild state they would not, I think, be able to form a third brood unless weather conditions had been remarkably different.

I have never seen so many *phlaeas* about, several of them quite good forms to which I shall refer later. A week of rainy days quite spoilt them and most of them disappeared; the few that were left were much faded and whitened, evidently again by the same damp conditions which, as I have already mentioned, seem to affect and bleach *M. jurtina*.—P. SIVITER SMITH, October 10, 1942.

PLUSIA MONETA, ETC.—This species was a pest on the Delphiniums this year. It is spasmodic in its appearance in quantity; it is several years since I saw it commonly. No remarkable variation in those bred. The cocoons, as usual, remained white until acted upon by moisture, when they turned to varying shades of yellow according to the moisture that reached them.

Other species were *Smerinthus populi*, fairly common, several with a strong rosy flush. *P. gamma*, early migrants and later examples were observed but not commonly. Many Geometridae showing melanic tendencies are to be found this side of Birmingham. *Pieris brassicae* and *P. rapae* were both most abundant this year.—P. SIVITER SMITH.

CURRENT NOTES.

SALE NOTES.—On Trafalgar Day (October 21st) the varieties of British butterflies from the B. H. Crabtree collection claimed the attention of Messrs Glendining & Co. and others. Most of the lots were single specimens, with here and there two and occasionally three examples.

Of five separate specimens of *A. euphrosyne* offered, an "extreme" ♀ with almost obsolete forewings and beautifully rayed hindwings on a black ground, sold for £11. Two *A. lathonia* which managed to reach Dover and Southend respectively were valued at two guineas each. Five *A. paphia* fell to the hammer at £6 15/- (ab. *melaina*), £4, £5, £12 (for a ♀ ab. *melaina* heavily suffused with black), and £14 for an almost black var. *valezina*. Three specimens of *A. aglaia* sold for ten guineas, £37 (♀ *albino*), and £6 10/-, whilst two *A. adippe* realised £9 10/-.

C. dispar sold at various sums ranging from £1 to £8 5/- each. Three *P. c-album* were dealt with respectively at £4 15/-, £3 16/-, and £36 for an unique white variety. Twelve more or less diseased *A. urticae* varied from five shillings to £6 5/- (superb example of ab. *nigrocaria* with almost jet black hindwings). Then six specimens of *N. io* changed hands at two guineas, five guineas, £1, £4 15/-, 5/-, and £8 for a superb very extreme ab. *belisaria* in bred condition.

An extreme male *A. iris* var. *iole* sold for £9 10/- and a *semi-iole* for two guineas. *A. camilla* var. *nigrina* realized three guineas, another £2 12/6, and a third £2 6/-. A beautiful golden male *M. jurtina* in bred condition £3 7/6. The specimens of *L. coridon* comprised no less than 61 lots and varied from 5/- to £12. If they perchance were mentioned and figured in the monograph by P. M. Bright and H. A. Leeds, then indeed their value was fabulous. The chief lots were £12 (♀ *radiata*); £11 (ab. *mixtaelongata-radiata*); ten guineas (♀ cream-coloured *caeca* ab. *limbojuncta*); £10 (hybrid *coridon* × *bellargus* ab. *polonus*); ten guineas (♂ albino type, ? ab. *livida*); £8 for a superb *cinnameus* in bred condition; £7 for an unusual *caeca* with wide borders; £6 15/- for a very fine ♀ *obsoleta* form; £6 10/- for a fine *caeca* ab. *alba*; etc., etc. Three pounds was given for a ♂ *phlaeas* with broad border enclosing row of marginal spots and £2 for two ♀ ab. *pallidula*. Four hybrid *bellargus* × *icarus* were disposed of for £3 10/-, £4 15/-, £5, and £5 10/- each. Six specimens of *P. icarus* realized £6 10/- (Irish gynandromorph), £5 15/- (similar), £6 (extreme radiated ♂ underside); £2; £1; and £6 (small perfect gynandromorph); *L. bellargus* were offered in 34 lots and prices ranged from 10/- to £12 for a large ♂ ab. *antidigittata*; £7 15/- for a large ♂ radiated on all four wings, etc., etc. £10 were given for a grand gynandromorph of *L. argiolus* and £2 for a grey ♀ ditto second brood.—H. E. P. [Ab. *nigrocaria* (either more or less) is not due to disease, and the so-called hybrids of *bellargus* × *icarus* are *bellargus* aberrations due to deficient pigment.—E. A. C.]

THE seventy-second Annual Report of the Entomological Society of Ontario, 1941, is now not an independently owned entomological publication but one of the Reports of the Department of Agriculture, Canada. Surely there are sufficient "followers of the net and pin" who interest themselves in the aesthetic and scientific side of our study and are independent of the economic. The present report is wholly economic and records from what has been styled the mercenary aspect are doubtless an adequate account of the economic work of the year.

THE *Pan-Pacific Entomologist* is published by the Pacific Coast Entomological Society and the Academy of Science of California. A great deal of faunistic work is in progress in this part of the States. Six articles are on the Hymenoptera, three on Coleoptera, three on Hemiptera, one on Siphonaptera (a Formosan species, the first from the island), one on new Centipedes, and an announcement of the formation of a new Commission on Scientific Nomenclature in Entomology.

FROM the *Indian Journal of Agricultural Science* we have received two further separates: 1—Biological Control of the Cotton Stem Weevil (*Pempherulus affinis*) in South India. There is a plate showing the results of the infestation, and many records of the same both before and after control efforts. 2—The Leaf-curl Disease of Tobacco in North India with an account of the White-fly Vector in reference to this disease, with a plate and many diagrams.

WE hear that Sir Guy Marshall, K.C.M.G., F.R.S., F.R.E.S., has retired from his position of Director of the Imperial Institute of Entomology at the Natural History Museum, a post he has held since 1913,

when the Institute was founded. We wish him a long and pleasant period of retirement, well deserved for the valuable work he has carried on so long. He is succeeded by Dr S. Neave, C.M.G., F.R.E.S., his most efficient assistant, and this assures that the work will go on with the same success as before.

To Dr Neave are due the thanks of all those who are interested in the Zoological Society of London for taking the duties of Hon. Secretary of that body. All we can say is that if he works with as much enthusiasm as he did for years while holding a similar position in the Royal Entomological Society of London, success will follow and the satisfaction of everyone will ease the tension which has lately arisen in the former Society.

AFTER much delay the Proceedings of the S. London Entomologist and N.H. Society for 1941-2 has been published. The present issue is Part II; Part I was issued in the autumn of 1941. The latter was a very valuable memoir on the "Nature of Hibernation in Lepidoptera," from an experimental point of view, with four excellent plates, and no doubt will produce much comment in the future. Part II contains the usual records of the Society's doings during the year, which were not so extensive as usual owing, naturally, to present circumstances. There are eight further plates, making twelve for the year. The official reports, finance and Council, are quite good, as was also the attendance at the, now monthly, meetings. The President's Address by Mr F. D. Coote, F.R.E.S., dealt with the Progress of the Society from its inception, showing the stability of its membership, the facilities it offered to members in their study of entomology by the contents of its big library and the comprehensiveness of the collections in all the usually studied Orders. Papers were read at most meetings, six of which were published: Diptera 2, Coleoptera, Plants, Hymenoptera and Lepidoptera 1 each; together with the Obituary of R. W. Attwood, whose death occurred under such tragic circumstances. A feature of the Proceedings is a Report with Records and Full Descriptions of Varieties and Aberrations exhibited, or prepared for showing, at the Annual Exhibition, compiled by Mr S. G. Castle Russell, and occupying 12 pages, to which has been added two excellent plates. [MS. delayed, with the October issue, through loss of proofs of the whole of the October number in the post.]

THE Society for British Entomology commenced Vol. viii of its *Transactions* in August last by issuing three parts. Part I, "A Preliminary List of the Hosts of some British Tachinidae (Dipt.)," by H. Audcent, M.Sc., is a very carefully prepared and scrutinized List for which the compilers of a "List of the Hymenopterous Parasites of the British Lepidoptera" had appealed. The present paper is divided into sections: (1) A List of the Tachinid Parasites, 195 in number; (2) a List of Hosts (in all Orders, even in Mammalia); and (3) a List of the sources of all the innumerable records attached to each species. Finally, a very full Index is included. This work should be most useful to all future students. Part II, "A Second Review of Literature concerning British Ichneumonidae (Hym.), with Notes on Palaearctic Species," by G. J.

Kerrich, M.A., F.L.S., F.R.E.S., is a useful summary, with many notes on various species including a consideration on Mr L. A. Carr's work on this group of Hymenoptera. Part III, "A Revision of the British species of *Cixius*, Latr. (Homoptera), including the Description of New Species from Scotland," by W. China, M.A. This paper is illustrated by numerous line figures mostly of genitalia and long lists of the synonymy of each species, evidence of much investigation of the subject on the part of the author. It is gratifying to see the amount of information on groups of insects which this Society is able to publish at short intervals.

THE parts 2 and 3 combined of the Spanish Revista of Entomology *Eos*, recently to hand, contains: 1, "Palaeartic *Acrididae* (Orth.) new to the Indian Fauna," by B. P. Uvarov of the British Museum. 2, "Results of the Study of the *Acrididae* of that part of the Sahara Desert under Spanish control," by C. H. Rungs. 3, "New species of *Cecoris*, Latr. (Hym.), from Oriental China," by J. G. Mari, and illustrated with useful diagrams of each species. 4, The *Hepialus* (Lep.) of Spain," by R. Agenjo, with a plate of figures of the imagines. The account of each species has a map of Spain inserted showing the distribution, and there are three plates of structural details. 5, A contribution to the Biology of the Ants of Spain," by W. Goetsch. This article is illustrated by altitude diagrams showing the elevation of the various species and the characteristics of the various zones; also figures of ants carrying an "umbrella" leaf over their body in a similar way to the habit of some S. American species. At the same time a further 32 pp. of the Supplement on the tribes of the Hymenoptera of Spain are issued, 81-112.

ENTOMOLOGICAL work in the Argentine goes on apace. We have received from our correspondent, K. J. Hayward, now of Tucuman, Estacion Experimental Agricola, four additional items on the *Hesperiidae* of S. America. The most imposing is an up-to-date Catalogue of the *Hesperiidae* of the Argentine containing details of over 400 species. Also pt. xii of *Hesperiidae Argentina* with descriptions of new species, and further new species from Ecuador. With the above were included five separate papers showing the work that was going on in the Agriculture Station, dealing with insect pests, particularly those attacking fruit, with details of the control in use in each case.

ATTENTION should be called to the loose way that the word "type" is so frequently used of late, even in more important matters, in magazine articles, reports, etc. Only in a comparatively very few cases can examples of a species or form be compared with the type. It should, of course, be compared with "a typical form." A large number of insects lie before me which bear the label "type." Not a single one of them is a "type." They are, in the opinion of the collector, specimens like the type, i.e. typical examples of the species and not the "original specimen" or "illustration" upon which the specific name was bestowed.

REVIEW.

A PRELIMINARY LIST OF THE HOSTS OF SOME BRITISH TACHINIDAE (DIPT.),
by H. AUDCENT, M.Sc. (Published 17th August 1942 as Part I,
Vol. 8, *Trans. Soc. Brit. Ent.*, pp. 1-42.)

This is a valuable work of reference, comprising:—(I) A list of nearly 200 species of this family of Diptera, which, by reason of its parasitic habits, is perhaps better known to Lepidopterists than any other; (II) A list of their hosts, not only Lepidopterous but also those that are known of the other Orders of Insects, and a number of additional Invertebrate and Vertebrate hosts ending with *Homo sapiens* with three references; (III) A bibliographical list of "Sources of Records"; and (IV) A closely printed Index containing about 1500 names and synonyms which gives some idea of the amount of painstaking research involved in the compilation of this work. Incidentally, Mr Audcent told the writer that the first copy of this Index was lost and that the whole of it had to be done over again.

By its general arrangement and system of cross-references the maximum of information has been compressed into the minimum of space; yet it is easy to use and not only entomologists, economic and otherwise, but all students of parasitology should find it a most valuable addition to their libraries.

Doubtless, as the author remarks, there is much more to be done in this particular line of research, and an extended and revised "List" may be needed in the future; but "c'est le premier pas qui coûte," and subsequent workers will find their labours greatly simplified by the existence of this solid foundation on which to build future additions.

Copies of this work can be obtained from Lieut.-Colonel F. C. Fraser, 55 Glenferness Avenue, Winton, Bournemouth, Hants, at 2/9, post free.
—H. W. A.

OBITUARY.

H. G. HARRIS, M.D.

I greatly regret to report the death of the late Dr Harris, of Southampton, whose kindly companionship I have enjoyed on many occasions in the New Forest and elsewhere.

Herbert George Harris died on the 3rd of October 1942 at the age of 68. He was the only son of the late Dr W. J. Harris, of Worthing, and was educated at Bradfield College and Durham University and at St Bartholomew's Hospital and the Newcastle-on-Tyne Hospital. Before settling in Southampton he practised at Birchington. A courteous and considerate physician and always a very kind man, he was greatly esteemed by his numerous patients, and at the memorial service at Southampton, at which the writer was present, many in the large congregation present were visibly affected. He was on the eve of retirement on the outbreak of war, but in spite of ill health this year he remained a determined worker to the end. Even after a very serious operation he omitted to take the essential rest, and this, no doubt, contributed to his end. Until 1939 he had been for 20 years the Medical

Officer to the Ordnance Survey Office at Southampton with its very large staff, and Honorary Medical Officer for 34 years to the Hampshire Girls' Orphanage. Dr Harris commenced collecting as a boy, and before the outbreak of war paid a great deal of attention to the Continental fauna and visited France and Italy annually with one of his sons, the late Rev. E. B. Ashby, Col. and Mrs Scott, Mr and Mrs B. E. S. Warren, Mr and Mrs Seth Smith, and Mr R. B. Morley. A full account of his captures in the districts he worked was sent to the *Entomologist's Record* on his return home and formed the subject of a paper read before a meeting of the Society for British Entomology.

His collecting in England was confined mostly to Hampshire, and he was thoroughly conversant with the fauna of the Winchester and Southampton districts, and was especially interested in the forms and aberrations of *Maniola jurtina*. He accumulated a fine collection of Continental and British and exotic butterflies which he left to his eldest son. He was a member of the South London Entomological Society.

Dr Harris is survived by his wife, three sons, and one daughter. He will be greatly missed by a large circle of friends and patients, who very sincerely regret the passing of a busy and useful life.—S. G. C. R.

CORRECTIONS.

In the *Ent. Record*, LIV, pp. (6) (7) (1942):

Omit "from that locality," line 16 from the bottom of p. (6).

For "typical" read "type," line 14 from the bottom of p. (6).

For "both" read "with," line 11 from the top of p. (7).

For "typical" read "type," line 12 from the top of p. (7).

After "Schreb.," add "mahogany form, Delamere. Two specimens of *Agrotis simulans*," line 7 from the bottom of p. (7).

After "in an earthen cocoon?" delete question mark, line 14, p. 78 (LIV).

NOTE.—We regret that owing to the loss or mislaying of a sheet of addresses some subscribers did not get their November number until very late.—EDS.

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brecciaeformis, Esp. (1790?), *Schm. Abbild.*, IV (2), 2, 79, plt. 198, 5.
(Syn.).

ab. *aberrans*, Evers. (1856), *Bull. Mosc.*, pt. IV, 105.

ab. *admiranda*; Obthr. (1880), *Et. d'Ent.*, V, 77.

ab. *hellwegeri*, Schwrd. (1919), *Zts. Ent. Ver. Wien*, IV, 31.

Tutt dealt with the typical form and its syn. *echii* and with ab. *aberrans*, Evers.

Tutt did not give the original description of ab. *aberrans*, Evers., but only a short summary from Stdgr., *Cat.*, of 1871.

f. *aberrans*, Evers., *Bull. Mosc.*, IV, 105 (1856).

ORIG. DESCRIP.—“*Alis anticis albo-lutescentibus: spatio medio postice angustissimo, brunneo, relictis stigmatibus medianis albidis, brunnescenti-centralis; stigmatibus claviformi fusco-circumscripto; lineis ordinariis dentatis fuscis: posticis grisescentibus.*” 1 ♂ worn. Kiachta, Russia.

“Much resembles *echii*. It chiefly differs in the central area of the forewings, which is so contracted at the hind margin that it is half the width as in *echii*; it is brown with the median spots light and the claviform distinct, semi-elliptic and encircled by deep brown.”

ssp. *admiranda*, Obthr., *Et. d'Ent.*, V, 77 (1880).

FIGURE.—*l.c.*, plt. 8, f. 11.

ORIG. DESCRIP.—“The ground of the forewing is a brown-fawn colour, becoming lighter to a pale chamois towards the base, the costal margin and the terminal border. The basal half-line is black on the outside, with a trace of brown. Below the median nervure and very near the base there is a black dot. The two outer basal and the elbowed lines are black and very sinuous. The orbicular brown, encircled with yellowish white, is surmounted with a yellowish-white spot touching the costa. Between the elbowed line and the subterminal, the space is fawn colour, less blackish than in the space between the outer basal and the elbowed lines, particularly along the latter. Then the terminal space is yellowish-white, traversed from top to bottom by a thick pale brown line.

“The hindwings are yellowish and blackish, particularly along the terminal margin. The thorax is yellowish-white, the abdomen grey.

“Below the hindwings are yellowish crossed by a waved blackish line below which the space up to the hind border is blackish-grey. The cell is closed by a blackish dot. The forewings below are blackish with the apex light.” W. China.

ab. *hellwegeri*, Schwrd., *Zts. Ent. Ver. Wien*, IV, 31 (1919).

ORIG. DESCRIP.—“An *irregularis* obtained in Waidbruck on 21st June is wholly yellow-brown. The usual white-yellow stigmatal spots of the forewings are of brown-yellow like the rest of the wings.”

Dianthoecia, Bdv. (1840). Most authors. [*Polia*, Tr. (1816-25), Hamp.: *Harmodia*, Hb. (1819), Meyr., Warr.-Stz., Meyr., Drdt.-Stz.] *carphophaga*, Borkh. (1792) = *lepida*, Esp. (1790-?).

Tutt, *Brit. Noct.*, III, 28 (1892): Meyr., *Handb.*, 79 (1895): Barr., *Lep. Brit. Is.*, IV, 233, plt. 162, 1 (1897): Stdgr., *Cat.*, III ed., 163 (1901): Splr., *Schm. Eur.*, I, 179, plt. 37, 28 (1905): Hamp., *Lep. Phal.*, V, 196 (1905): South, *M.Br.I.*, I, 251, plt. 124, 9-10 (1907): Warr.-Stz., *Pal. Noct.*, III, 76, plt. 17 i (1909): Culot, *N. et G.*, I (1), 119, plt. 20, 18, plt. 21, 1-2 (1911): Meyr., *Rev. Handb.*, 149 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 102, plt. ? (1931).

In the *Nachträge* to the *Verz.*, p. 313, N. 21-22 (1775), Schiff. gave *perplexa*, which is considered by some to be *carpophaga*, but in the absence of details even of the food of the larva one cannot give the name priority value. Illiger, *N. Ausg. Verz.*, simply copies the original "dull brown and whitish marked" and gave no comment.

Ernst & Eng., *Pap. d'Eur.*, VII (1790), fig. 488, gave two illustrations of a *Dianthoecia* ♂ and ♀, but the text, p. 114, gave no information except that they are so different as probably to be two species. Of these figs. Werneburg, *l.c.*, II, 120, showed that they cannot be *perplexa*.

Esp., *Abbild.*, IV, *Noct.*, II (1), p. 500, plt. 152, 2 (1790-?), gave a figure which he called *lepida*, and which is now taken as the priority original form.

Borkhausen, in Scriba's *Beitr.*, III, 204 (1793), said that its markings and the markings of the larva place it in Fam. O of the *Verz.*, Schiff. "Breitstreifraupen jaspisfarbigte Eulen." It was figured, *l.c.*, plt. 13, f. 4.

Its ground colour was a grey-brown mixed with shades of bistre colour, either paler or darker. About the size of *serena*.

Borkhausen, *Naturg.*, IV, 424 (1792), said that this species was probably described and figured by Esper under the name *lepida*, *Abbild. Noct.*, IV (1), 73, plt. 152, 2 (1790). Tutt does not seem to have noticed that the figure of *lepida*, Esp., of which he gives the original description, predated *carpophaga*, Bork. It may be that the true dates of Esper were not then sufficiently well ascertained.

Borkhausen, *l.c.*, 422, gave references to the *contigua* of Fab. (*Mant.*), de Vill., Schiff., Goeze and Jung, but this must be incorrect, as they all gave the food-plant as *Chenopodium bonus-henricus*, while Borkhausen gave *Lychnis dioica* and such like plants as the food of the larva.

Hübner's fig. 89 (1802) is a very dark, rich brown form of *carpophaga* with lighter brown and ochreous markings, and not the dark *capsophila*, which is black-brown and white.

Dup., *Hist. Nat.*, VI, 305, plt. 92, 1 (1926). The figure is given as that of *carpophaga*, Ochs. It was such a dark colour that at first it appeared that it must be a *capsophila*, especially as it was stated by Dup. "to be rare everywhere" and not known then in France. However, on close examination and comparison the figure was noted as being very dark brown not black, with luteous not white marking and with almost uniformly grey hindwings and small in size. In fact, it was the darkest form of *carpophaga* I have noted. On turning to Dup., *l.c. Supp.*, IV, 100, plt. 58, 8 (1842), there was a figure given as that of *capsophila*, And. Bdv., and actually lighter in general effect than the figure given of *carpophaga*, because of the well expressed fine white marking. There was not a trace of luteous tinge, the brown coloration was a black-brown, the size was larger than that of *carpophaga* and the

hind-wings were those of *capsophila* with the well differentiated dark or blackish and wide hind-marginal area.

Treit., *Schm.*, V (1), 306 (1825), treated of the *carpophaga*, Bork. = *lepida*, Esp., under the name *perplexa*, Hb. (*Samml.*, 89). He referred this name originally to the *Verz. Supp.*, 313, N. 21-22 (1775). Also to Bork. (*Schm.*) and (Scriba's *Beitr.*). This last, a very mottled example. He described it as very varied in ground colour and covered all over with a suffusion of dark brown in the yellowish-grey, and remarked on its small size. This is undoubtedly our *carpophaga*.

Treit., *l.c.*, VI (1), 391 (1827), said that although the fig., plt. 73, of Esper agrees exactly with his *perplexa*, according to Esper's text it should be held to be a variety of *porphyrea*. Of this Werneburg said, *Beiträge*, II, 47, it was not what Esper said but what he figured which was to be considered, and that the figure was quite distinctly *perplexa*, i.e. *carpophaga*. Like Bork., Werneburg said *lepida* was the oldest valid name.

Freyer, *Beitr.*, II, 120, plt. 86 (1829), gave a good figure of one of the dark forms under the name *perplexa* and referred to Hb. 89. Probably a dark *capsophila*. He said that Scriba's figure of *carpophaga* (*Beitr.*, III, plt. 13) is a good figure.

Freyer, *Neu. Beitr.*, I, 63, plt. 34 (3), 2 (1833), gave a very good somewhat similar figure under the name *repanda*. Probably another dark *capsophila*.

H.-S., *Sys. Bearb.*, II, 330, fig. 61 (1850), was not quite clear about *repanda*, Frr. (Kind.), of which he had only one not quite perfect worn example. Hampson and others have thought this to be *carpophaga* form.

H.-S., *Sys. Bearb.*, II, 249 (1850), dealt with *carpophaga*, which he identified with *perplexa*, Hb. His description is definitely that of a dark form approaching *capsophila*, but with the general characteristics of *carpophaga* of the continent.

H.-S., *l.c.*, 348, fig. 462 (1850), gave a figure of *capsophila* which hardly agrees with his description, in which the bone-colour, and ochraceous area is emphasized and "no pure white as in *carpophaga*." In fact he has muddled the two forms (or species). The figure is the more correct although rather on the lighter side with a slight suggestion of luteous coloration.

H.-S., *l.c.*, f. 461 (1850), described and figured a form he called *nisus* and referred it to the *nisus*, Germ. But Germar's *nisus* was a different species and much more resembled *irregularis* and is placed in another genus, while the figure in H.-S. was that of a *capsophila* form, and quite comparable with many of the numerous dark continental forms of this "twin species."

Gn., *Hist. Nat. Noct.*, VI (11), 19 (1852), suggested that *carpophaga*, Bork., may turn out to be the *anceps* or the *perplexa* of the *Verz.* (Schiff.) or the *lepida*, Esp., but considered that Borkhausen's name has the greatest stability. He considered the *ochracea*, Haw., as the English representative of the continental darker form, and doubtfully the *capsophila*, H.-S., 462 (nec *capsophila*, Bdv.). Guenée's form A of the continental *capsophila*, Bdv., is the dark insect found in the Isle of Man and Ireland.

Gn. suggests that *nisus*, Germ., is only a modification of var. A of *capsophila*, but he had never seen it.

Kane, quoted by Tutt, *Br. Noct.*, III, 28, when writing of *capsophila*, said, "*Carpophaga*, however, is a variable species, and sometimes the darkest specimens look to an experienced eye like worn *carpophaga* [Surely this should be *capsophila*.—Hy. J. T.], but it never, so far as I have seen it, acquires the true colour." Cf. *Ent. Rec.*, II, 273.

Tutt, *l.c.*, discussed the differentiation of the two at some length and sifted the evidence and opinions of those entomologists, C. G. Barrett, Kane, Guenée, Robson, Birchall, Newman, Blandford, Murray, etc., all of whom had had much experience collecting, breeding and observing, and he concluded that every factor pointed to two species, the late C. G. Barrett being almost the only champion of the two being one species. His, Tutt's, finding was that there were two separate species with perhaps the eventuality that *capsophila* was a ssp. with almost complete specific rank.

Barrett, *l.c.*, plt. 162, gave eleven figures. 1, a typical S. of England fulvous form with markings well expressed; 1a, a Suffolk form similar in colour but with markings finer and less expressed; 1b, but few markings present, the remainder reduced to mere dots or scratches, similar in ground colour, Suffolk; 1c, a Sussex well-marked form with only the faintest yellow tinge in places; 1d, a somewhat similar form, with yellow-tinged hindwings, and forewings also very slightly yellow; 1e, 1f, both very heavily fulvous and dark, S. Wales and S. Scotland; 1g, a still darker form, no yellow tinge but dark brown, with very white sub-marginal line, and a few other scattered light markings; 1h, 1i, 1j, the Irish *capsophila* form, 1h with fine white markings on a very dark (not fulvous) ground, 1i with some markings light brown, 1j a still darker form generally.

Stdgr., *Cat.*, IIIed., 163 (1901), treated the *capsophila* of H.-S., 462, as a syn., and the *capsophila*, Dup., as v. (et ab.), with *nisus*, H.-S., 161, as a syn. He accepted the *ochracea*, Haw., as an ab. but treated the *pallida*, Tutt, as a syn. of it (multo-pallidior, al. ant. ochraceis vel ochracea-albidis).

Splr., *Schm. Eur.*, I, 179, plt. 37, 28: plt. 29, 8 (1905), gave 3 fairly good figures and dealt with the forms *ochracea*, Haw., *fuscopallida*, Tutt, *capsophila*, Dup. (plt. 37, 29), with ab. *suffusa*, Tutt.

Hampson, *l.c.*, V, 196 (1905), treated *capsophila* as an aberration of *carpophaga*. It does not seem correct to treat it thus; it must either be a very closely allied species, or a very strongly characterized subspecies.

South, *M.B.I.*, I, 251, plt. 124, 7-10 (1907), considered the British races as one species, *carpophaga*, and gave four figures; 10 was a *pallida* form not too extreme. Figs. 7 and 8 are ♂ and ♀ *capsophila*, the Irish and I. of Man form, and very good figures. Fig. 9, from Pembrokeshire, is said to "have a colour range intermediate between *carpophaga* (British) and *capsophila* (Irish)," but it is not so, but a good figure of the form *ochracea*, Haw., without any black marking but wholly of luteous shades of colour and not even the dark *suffusa*, Tutt.

Pierce, *Genit. Noct. Brit. Is.*, 63 (1909), said, "I can detect no difference between this and the preceding (*carpophaga*) unless it be that the teeth in the band of the vesica are a little longer and stronger."

Warr.-Stz., *Pal. Noct.*, III, 76, pls. 17i, 18d, gave nine good figures with the species name *lepida*, Esp., and considered the *carpophaga*, Bork., and the *perplexa*, Hb., as synonyms. In figures ♂ and ♀, 17i,

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